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January 1958

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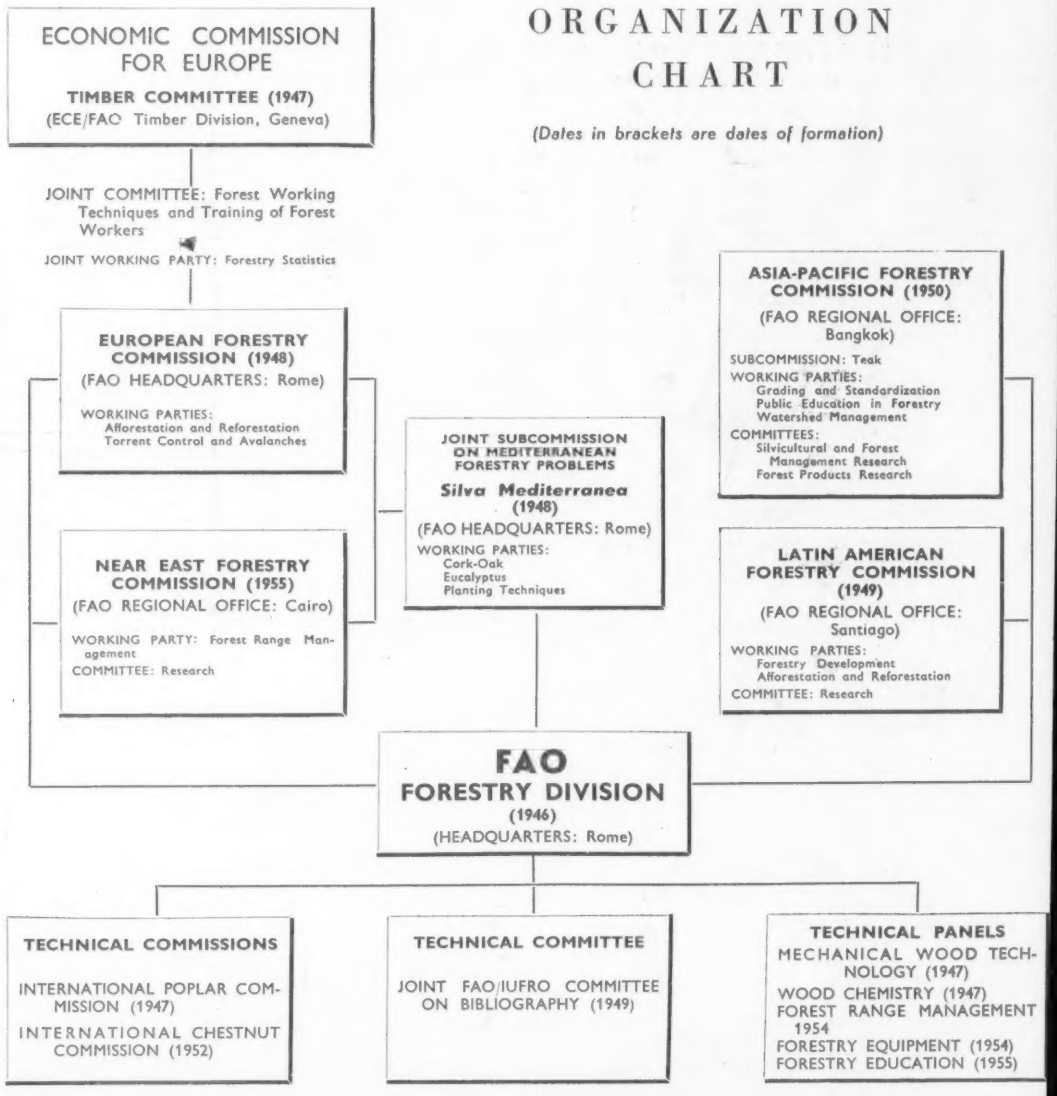

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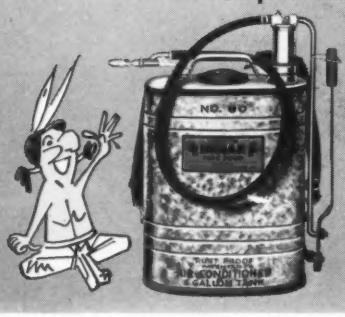

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Journal of Forestry

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Journal of Forestry

Official Organ of the Society of American Foresters

George A. Garratt, Henry J. Malsberger Elected SAF President, Vice President

New Council, Fellows Named

George A. Garratt of New Haven, Conn. was elected December 2 as president of the Society of American Foresters by mail ballot of the members for the two-year term 1958-1959. He succeeds DeWitt Nelson, Sacramento, Calif. who was not a candidate for re-election.

Dr. Garratt, who is dean of the Yale School of Forestry, was vice president of the Society during the biennium 1956-1957. With forestry degrees from Michigan State University and Yale, Dr. Garratt has been in forestry education for the past thirty-seven years, first at Michigan State, then at the University of the South (Tenn.), and at Yale since 1925. He has been dean of the Yale School of Forestry, the oldest forestry school in the Western Hemisphere, since 1945.

Henry J. Malsberger of Atlanta, Ga., general manager and forester, Southern Pulpwood Conservation Association, was elected vice president of the Society. A forestry graduate of Pennsylvania State University, Mr. Malsberger began his professional career with a Florida lumber company in 1925. In 1928 he joined the Florida Forest Service. He became a district forester in 1931, assistant state forester in 1934, and director of forests and parks in 1937; this title later changed to state forester and park executive. In 1945 he was appointed forester for the Southern Pulpwood Conservation Association, an industrial organization formed in 1939 as an educational medium to promote public interest in forestry and the application of profitable forest practices.

Council Members

Organized in 1900, the Society of American foresters with headquarters in Washington, D. C. has a membership of almost 12,000 professional foresters practicing in the United States and Canada. Its governing body is the Council composed of the president, vice president, and nine additional members. The following foresters were elected to the Council for two-year terms 1958-1959:

B. E. Allen, assistant manager, Woodlands Division, Union Bag-Camp Paper Corporation, Savannah, Ga., for a second consecutive term.

Philip A. Briegleb, director of the Southern Forest Experiment Station, New Orleans, La., for a second consecutive term.

Donald E. Clark, regional forester, Rocky Mountain Region, U. S. Forest Service, Denver, Colo.

Charles A. Connaughton, regional forester, California Region, U. S. Forest Service, San Francisco, Calif.

Kenneth P. Davis, chairman of the Department of Forestry, professor of forest management, School of Natural Resources, University of Michigan, Ann Arbor, Mich.

Maurice K. Goddard, secretary, Pennsylvania Department of Forests and Waters, Harrisburg, Pa., for a second consecutive term.

William D. Hagenstein, managing director, Industrial Forestry Association, Portland, Ore.

Herbert J. Stone, regional forester, Pacific Northwest Region, U. S. Forest Service, Portland, Ore., for a third consecutive term.

Henry J. Vaux, dean, School of Forestry, University of California, Berkeley, Calif., for a second consecutive term.

Fellows Elected

In addition to the foregoing officers, the following sixteen Fellows were elected. Election to the grade of Fellow is conferred only for outstanding achievement in forestry.

C. Huxley Coulter, state forester, Florida Forest Service, Tallahassee, Fla.

Charles S. Cowan, manager, Washington Forest Fire Association, Seattle, Wash.

James F. Dubuar, director and professor of forestry (retired), New York State Ranger School, Wanakena, N. Y.

Bernard Frank, assistant director, Division of Watershed Management Research, U. S. Forest Service, Washington, D. C.

Paul M. Garrison, chief forester, Gaylord Container Division, Crown Zellerbach Corp., Bogalusa, La.

S. R. Gevorkiantz, biometrician, Lake States Forest Experiment Station, St. Paul, Minn.

Edwin F. Heacox, managing forester, Weyerhaeuser Timber Company, Tacoma, Wash.

Svend Oluf Heiberg, chairman, Department of Silviculture, State University College of Forestry at Syracuse University, Syracuse, N. Y.

Joseph C. Kircher, consulting forester, Mt. Dora, Fla.

Harold J. Lutz, professor of silviculture, Yale School of Forestry, New Haven Conn.

Perry H. Merrill, director, Department of Forests and Parks, Montpelier, Vt.

DeWitt Nelson, director, California Department of Natural Resources, Sacramento, Calif.

Earl Porter, manager, Woodlands Department, Southern Kraft Division, International Paper Company, Mobile, Ala.

Russell R. Reynolds, research center leader, Southern Forest Experiment Station, Crossett, Ark.

William G. Wahlenberg, research forester, Asheville, N. C.

Philip C. Wakeley, research forester, Southern Forest Experiment Station, New Orleans, La.

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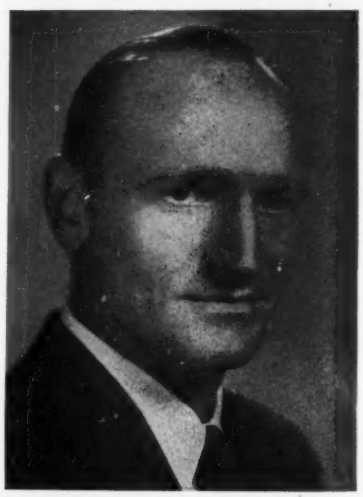

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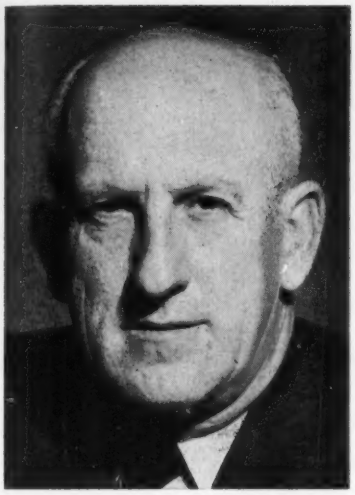

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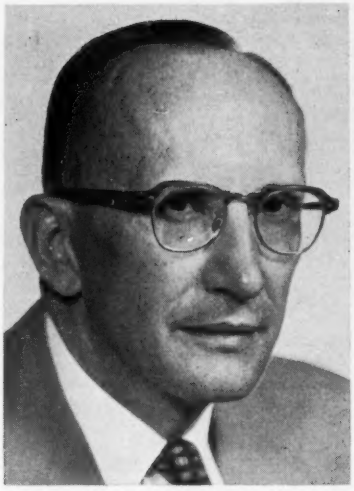

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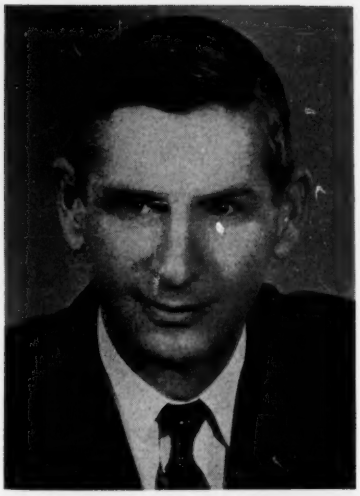

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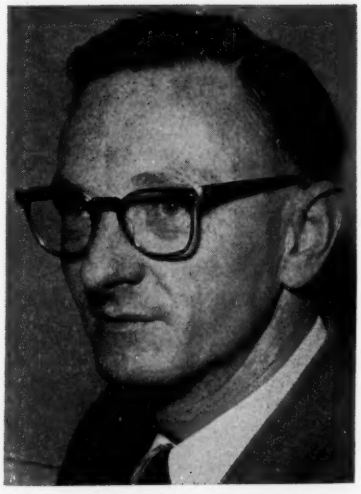

HENRY J. VAUX

Forestry's Role in FAO: A Report on the Ninth Conference

Henry Clepper
Executive secretary,
Society of American Foresters

THE NINTH session of the Food and Agriculture Organization of the United Nations was held at its international headquarters in Rome during the period November 2-23, 1957. It was attended by 542 delegates and observers from 77 member nations. The U. S. delegation numbered 22 persons including six members of the House of Representatives, and was headed by Ralph S. Roberts, Administrative Assistant Secretary of Agriculture.

Five technical committees considered phases of the proposed program of work for the biennium 1958-1959. These committees had to do with agriculture, fisheries, forestry, information, and nutrition.

Forty foresters from 31 nations comprised the Technical Committee on Forestry which held six sessions. Richard E. McArdle of the U. S. delegation was designated chairman of the committee.

Two additional foresters were on the American delegation: V. L. Harper, assistant chief (research), U. S. Forest Service; and Henry Clepper, executive secretary of the Society of American Foresters.

Among the representatives present who are well known to American foresters were Eugenio de la Cruz, director of the Forest Products Research Institute of the Philippine Republic; Professor Eino Saari of Helsinki University, Finland; F. L. H. Johansson, director-in-chief of the Board of Forestry, Stockholm, Sweden; A. Y. Goor, director of Forests, Nathanya, Israel (a graduate of the Yale School of Forestry); K. H. Oedekoven, chief of forestry, Ministry of Food, Agriculture and Forestry, Bonn, Germany; Sir Henry Beresford-Peirse of the British Forestry Commission, London; and A. L. Best of the Canadian Department of Northern Affairs and National Resources, Ottawa. Professor Aldo Pavari, director of the Forest Experiment Station at Florence, Italy, which many American research foresters have visited, was also present as the representative of the International Union of Forest Research Organizations.

FIG. 1.—V. L. Harper, assistant chief in charge of the Branch of Research, U. S. Forest Service, and Henry Clepper, executive secretary of the Society of American Foresters, were forestry advisers to the U. S. delegation at the ninth FAO conference.

Forestry's Place in FAO

At a conference of FAO held at Quebec in 1945, forestry was assigned a most important role: to help provide supplies of forest products, in suitable quality and sufficient quantity, needed for world consumption. Thus, the activities of the Forestry Division include not only the growing of forests and the harvesting of timber, but the marketing and distribution of their products.

This work, under the Forestry Division, has four objectives: (1) to increase the yield of existing world forests; (2) to reduce waste of raw material; (3) to open up such areas for development, particularly in tropical regions; and (4) to establish new forests both for the economic use of products and for the protection of watersheds and the prevention of soil erosion.

Forestry, therefore, is a significant aspect of the work of FAO. Although world problems of nutrition and health are, understandably, of major concern to all the nations holding membership in FAO, the increasing contributions of useful products and services possible through scientific forest management are desired by all nations.

FAO is one of several international organizations to which the U. S. Congress makes substantial contributions. About 31 percent of FAO's biennial budget of $17,000,000 is paid by the United States. Approximately 14 percent of FAO's budget goes to forestry, directly and indirectly.

The Forestry Division

The director of the Forestry Division is Marcel Leloup. Egon Glesinger is deputy director. Both are well known in the United

States, having appeared on the programs of meetings both of the American Forestry Association and the Society of American Foresters. M. Leloup is a professional forester. Dr. Glesinger is a forest products economist.

Besides these, the Divisions' headquarters staff includes 27 foresters and forestry technicians. Technical operations are centered in three branches: policy, technology, and economics.

A well-known American forester, I. T. Haig is chief of the Technology Branch, two of whose members are also foresters of American origin—M. A. Huberman and J. M. Yavorsky.

In addition, FAO maintains three regional forestry offices: the Latin-American office at Santiago, Chile; the Asia and Far East office at Bangkok; and the Near East office at Cairo. Significant of the importance attached to the work of these regional offices is the fact the Conference recommended that they be strengthened by adding one officer to each station, and that an additional office for Africa be established.

An expansion in the technical assistance program was also given high priority. This is an activity through which FAO (1) tackles general international problems and (2) deals with specific problems.

Examples of the first category are world forestry congresses and international conferences on such subjects as poplar, chestnut, and eucalypts; pulp and paper; fiber boards and particle boards; and logging and related forest operations.

Direct technical assistance takes many forms. FAO experts helped set up a school of forestry at the University of Santiago; regional forest research centers and schools for forest rangers for Latin America in Venezuela and for the Near East in Syria; and a training center in watershed management in India.

According to Director Leloup, the Forestry Division during the past five years handled 195 such assignments in 47 different nations; organized 19 training centers and study tours; and awarded 124 fellowships.

FIG. 2.—Marcel Leloup, director of FAOs Forestry Division; and Richard E. McArdle, chief of the U. S. Forest Service, who served as chairman of the Forestry Committee and presided over its sessions.

FAO has also helped member nations to set up forest inventories, to gather and compile statistics on growth and production, to undertake commodity reports on industrial development, to establish forest policies, to make land use studies. Indeed, FAO's activities in forestry are so numerous and global that it would require a book to describe them. Some concept of the organization's scope of work may be obtained, however, if one thinks of it as a world-wide forestry extension service with related responsibilities in technical education and research.

An interesting example of FAO's activity in these fields is a proposed seminar and study group of perhaps 50 senior technicians who would be sent in 1958 to the United States for eight weeks by their governments to study watershed management techniques. The project would be jointly sponsored by the Agriculture and Forestry Divisions.

The Technical Committee on Forestry

The technical committees are advisory in nature. This is to say, the committees reviewed FAO's work in each technical field since the last previous conference, and examined proposed programs for 1958-1959. When specific fields were of interest to two committees, they held joint meetings, as was the case when the subjects of seeds and watershed management occasioned combined conferences by the panels on agriculture and on forestry.

All discussions were multilingual, in English, French, and Spanish. Simultaneous interpretation was carried on so that there were no delays in the proceedings. Despite the technical nature of much of the terminology, one knew at every point of the discussion exactly what was being said.

A salient feature of the conference was the *esprit de corps* that developed among the foresters, all the more remarkable considering the diversity of nationalities, education, race, geography, and points of view. On many issues, but not all, the foresters from Latin America, the United States, the Scandinavian countries, and Germany saw eye-to-eye. On others, particularly the controversial Mediterranean Development Project, the foresters from the Mediterranean nations and the Near East were generally in agreement.

Many of the topics considered, while of great importance, were of a routine nature; that is, they had to do with the continuing day-to-day work of the Forestry Division and the ways by which forestry should contribute to the well-being

FIG. 3—At the Society of American Foresters' luncheon for foresters attending the FAO conference. *L.* to *R*, Professor Eino Saari of Finland, an Honorary Member of SAF; Dr. Richard E. McArdle; M. Marcel Leloup, director of FAO's Forestry Division; and Professor Aldo Pavari of Italy, also an Honorary Member of SAF.

and incomes of rural populations and forest workers.

The work of the regional forestry commissions, of which there are four, was reviewed and commended. These commissions are currently active in Europe, the Near East, the Asia-Pacific area, and Latin America. Attached to these commissions are working parties that are engaged in afforestation and reforestation, and torrent control and avalanches in Europe; research in the Near East; research in silviculture, forest management, and forest products in the Asia-Pacific region; and research in Latin America. In Europe is a subcommission working on cork oak, eucalyptus, and planting techniques.

The conference asked the Director-General to consider a regional training center in aerial survey techniques in the Far East, and supported a continuation of FAO's analytical studies in timber trends.

Mediterranean Project

One of the most controversial proposals, of interest not alone to the Forestry Committee but to the whole Conference, was the Director-General's Mediterranean Development Project. This in effect is planned as a comprehensive regional program of social and economic development for the nations of the Mediterranean basin, particularly those of the eastern portion.

Among other things, the proposal provides for reforestation, watershed protection, and related forestry activities. But in addition extensive economic and social development not confined to agriculture, fisheries, and forestry is contemplated.

Of this phase of the plan many delegates had reservations as going outside the scope of FAO's authorized functions. Moreover, some representatives questioned the propriety of FAO undertaking to do for nations on a regional basis what they should, with FAO's technical assistance, do individually for themselves.

There was no disagreement as to the importance of reforestation in this part of the world, and of the relation of tree planting to pasture improvement, soil stabilization, and watershed protection. The disagreement centered around the possibility, because of the regional nature of the problems, of a centralized imposed form of development by FAO, rather than decentralized development by the individual nations participating, with technical advice and service from FAO.

World Forestry Congress

The fifth World Forestry Congress, scheduled to be held in Seattle, Washington, during the period August 29-September 16, 1960, came in for considerable discussion. The program will feature multiple-use forestry. Thus in addition to forest management, there will be papers and discussion of range management, wildlife management, forest recreation, watershed management, and related subjects, including tropical forestry.

Organized tours to various forest operations in the Pacific Northwest will be featured. Foresters from other nations specifically requested tours to the Forest Products Laboratory and to the southwestern states to observe aridland management.

While it is admittedly too early to anticipate the number of foresters from abroad who may be in attendance, plans will be necessary to accommodate 300 foreign foresters as well as the same number or more from the United States.

Preliminary plans call for the designation of a general chairman by the State Department, and the formation early in 1958 of an organizing committee broadly representative of all forestry interests in America.

Previous Congresses were held in Rome in 1926, in Budapest in 1936, in Helsinki in 1949, and in India in 1956. This fifth Congress will be the first ever to be held in the Western Hemisphere, and will provide an opportunity for America to show the world the progress forestry can make, on public and on private lands, under democracy and capitalism. Future announce-

FIG. 4—The headquarters of the Food and Agriculture Organization of the United Nations in Rome, Italy. The building is rented to FAO by the Italian government for one dollar per year.

ments of plans and programs will be published promptly in the JOURNAL OF FORESTRY.

The Foresters' Luncheon

One of the highlights of the conference was a luncheon held in the FAO restaurant on November 13 for all the foresters. In attendance were about fifty foresters from thirty nations, including some from the staff of FAO. The affair, which did much to engender a spirit of comradeship among the numerous races and nationalities represented, was arranged by a committee of the Society of American Foresters consisting of Henry Clepper, I. T. Haig, M. A. Huberman, V. L. Harper, and R. E. McArdle.

A major purpose of the get-together was to promote interest among the delegates in publicizing the Fifth World Forestry Congress to be held in Seattle in 1960. A surprise feature of the occasion, however, was the announcement by Dr. McArdle of the presentation to Mr. Clepper of the Gifford Pinchot medal. Dr. Harper, acting on authorization of the Council, read the citation used by President Nelson on this same date at the Society's annual dinner in Syracuse, N. Y. when the medal was presented *in absentia*.

Sanitation-Salvage Controls Bark Beetles In Southern California Recreation Area

Ralph C. Hall
Entomologist, California Forest and Range Experiment Station, Forest Service, U. S. Department of Agriculture[1]

ENTOMOLOGISTS AND FORESTERS have shown that insect depredations can be effectively suppressed through sanitation-salvage logging without damaging an area for recreational use. This conclusion is substantiated by the results of a test in the heavily used Barton Flats Recreational Area of the San Bernardino National Forest. In the test, infested trees and those considered to be most susceptible to insect attack and damage were cut and utilized for lumber. Yet scenic and recreational values of the forest were maintained (Fig. 1).

As pointed out by Rosecrans[2] the sanitation-salvage program was a history-making forestry project in developing a new concept of forest management in recreational areas. Many foresters were skeptical of public acceptance of cutting timber in recreational areas. But, when the people were informed as to the objectives and when they saw the results, there was practically no adverse reaction to the program. Many felt that scenic values were enhanced by the removal of the sickly trees and the old accumulated dead snags.

Entomologists have fought bark-beetle outbreaks in the Barton Flats area since the days of the C.C.C. In 1950, control crews felled and burned 554 bark-beetle-in-

FIG. 1.—Part of the Barton Flats area after the sanitation-salvage control. With less than two trees cut per acre and careful logging, the original stand has had little disturbance.

[1]The Experiment Station is maintained at Berkeley, California, in cooperation with the University of California.

[2]Rosecrans, W. S. Logging in recreational forests. Amer. Forests 63 (5): 20-22, 56-59, illus. 1957.

fested trees on 2,600 acres at a cost of $11,380, or about $20 per tree. Money was not available to treat infested trees over the entire area affected in 1950. Next year, the infestation continued at a high level: survey crews spotted 1,100 infested trees on 6,000 acres, and control costs were estimated at $22,000, or twice as much as was spent in 1950. Direct control by felling and burning obviously was creating a serious financial burden for taxpayers.

In this area the timber type and insect complex are similar to those in northeastern California where sanitation-salvage had proved effective.[3] The timber is principally mixed Jeffrey and ponderosa pine (*Pinus jeffreyi* Grev. and Balf. and *P. ponderosa* Laws.), with some white fir (*Abies concolor* [Gord. and Glend.] Lindl.), incense-cedar (*Libocedrus decurrens* Torr.), and sugar pine (*P. lambertiana* Dougl.). The principal insect species are the western pine beetle (*Dendroctonus brevicomis* Lec) in ponderosa pine; the Jeffrey pine beetle (*D. jeffreyi* Hopk.) in Jeffrey pine; and the California flatheaded borer (*Melanophila californica* Van D.) in both species. Other minor associated species are the fir engraver (*Scolytus ventralis* Lec.) in white fir, and the mountain pine beetle (*D. monticolae* Hopk.) in sugar and ponderosa pine.

FIG. 2.—The thin-crowned tree in the middle background is the type of risk III tree not marked for cutting at Barton Flats.

Therefore, a test of sanitation-salvage was suggested for the Barton Flats area. This type of cut is a selective removal of the ponderosa and Jeffrey pine trees considered to be most susceptible to attack by bark beetles. Generally speaking all the high-risk trees (risk III and IV) are cut, but for the recreational area a modified cut—all risk IV but not all risk III trees—was suggested.

The Operation

This suggestion was adopted. The operation started in October 1953, was completed in December 1954, and covered about 5,500 acres. Along highways and in heavily used camps and picnic areas, only risk IV trees were cut. In the rest of the area, all the poorer risk III trees were cut too; the better risk III trees were not removed (Fig. 2). Altogether, sanitation-salvage removed a total of 8,063,000 merchantable board feet, or about 1,470 board feet per acre.

[3] Salman, K. A. and Bongberg, J. W. Logging high-risk trees to control insects in the pine stands of northeastern California. Jour. Forestry 40: 533-539. 1942.

Entomologists estimated the original stand as follows:

Item:	*Board feet per acre*
All live sawtimber	12,320
Volume in high risk	
Risk IV	800
Poor risk III	720
Good risk III	830
Total	2,350

The cut averaged 11.9 percent of the original stand volume. It took 1.7 trees per acre from a total of 14.8, or 11.5 percent of the original number.[4] The residual risk trees amounted to 880 board feet per acre, close to the original estimate of 830 board feet in the good risk III class.

After the sanitation-salvage treatment, the San Bernardino National Forest carried on a program of year-round maintenance control, the main objective being to log all infested trees. Some of the infested trees were in inaccessible areas; control crews treated these by felling, bucking, and spraying with ethylene dibromide in oil.

Losses After Logging

We now have two years of mortality records following sanitation-salvage in the Barton Flats area, and the results are very encouraging. In 1955, the first year after treatment, 69 trees containing 63,240 board feet were infested, which represented 12 board feet per acre. This low level persisted the next year, when 86 trees containing 83,235 board feet were infested, which represented 15 board feet per acre.

Local foresters observed that many of the trees that had become infested since the sanitation-salvage treatment were those in the poorer risk III class left in the high-use campground and picnic areas and the better risk III on the rest of the area. Had these trees been cut, losses probably would have been even lower.

Losses the two years before sanitation-salvage treatment were estimated to have exceeded 200 board feet per acre. Although there is no adjacent untreated area which can be used as a check, the level of loss in southern California has generally been epidemic. In fact, the 1956 losses in other somewhat comparable areas were the highest for the past five years. An annual loss of at least 150 board feet per acre without treatment seems like a conservative assumption. At this level, losses were reduced by 92 percent the first year and by 90 percent the second year.

This sanitation-salvage operation had two beneficial effects. First, it greatly reduced subsequent losses on the treated area. Second, the system of roads built for this operation made it possible to salvage 72, or 84 percent, of the infested trees during the 1956 season. Records are not available for the percent of infested trees logged during the 1955 season although it is believed to be approximately the same as for 1956. This was a continuing program, the trees being removed within a few days after they were spotted. These infested trees were sold at a nominal stumpage. The 14 infested trees that could not be logged cost about $280 to treat.

This sum represented the total direct-control cost on 5,500 acres. If credit is taken for the 72 infested trees that were logged, then control cost the government practically nothing.

From present indications, the sanitation-salvage trial in the Barton Flats area for the first two years is as good or better than the results obtained in similar stands in northeastern California.

We believe that sanitation-salvage will give satisfactory protection from insects in the Barton Flats area for at least 10 years. From experience elsewhere, it is reasonable to believe that most of the high-risk trees harvested would have been killed by bark beetles in this period had they not been cut, and the snags would create a serious fire and safety hazard. At $20 per tree, direct control would have cost about $190,000. Indirect control by sanitation-salvage not only has made this outlay unnecessary, but has enabled the Government to realize about $50,000 from the sale of the trees harvested.

[4] Data from Division of Timber Management, Region 5, U. S. Forest Service.

Oregon Library Houses Greeley Papers

A collection of 5,000 letters dating from 1929 to 1955, as well as diaries, manuscripts of speeches and articles, memos, and statements from Col. William B. Greeley's personal files and those of the West Coast Lumbermen's Association have recently been placed in the library of the University of Oregon by the Greeley family.

Blister Rust Control Aided by the Use of Chemicals for Killing Ribes

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ELIMINATION of *Ribes* spp.[3] in the vicinity of white pine by grubbing, by pulling, or by chemical treatment is the only means now known of controlling the destructive white pine blister rust (*Cronartium ribicola* Fischer).

Hand pulling and grubbing have been and are still the principal methods of killing ribes in white pine forests of the United States. Nevertheless, these methods are tedious and costly where ribes bushes (1) occur in dense populations, (2) have developed multiple root crowns that are difficult to locate or have trailing stems that break easily, (3) are unusually large and have extensive and deep roots, (4) are rooted under logs or stumps or in rock crevices, (5) have roots that are intertwined with and are protected by those of other woody plants, and (6) are small and therefore difficult to find in dense vegetation.

To cope with these special problems effective chemicals and methods have been devised for (1) broadcast spraying brushy vegetation containing ribes, (2) selectively spraying dilute aqueous solutions on the foliage and stems of ribes, (3) wetting the basal stems of intact bushes with oil solutions, (4) treating the freshly cut surfaces of decapitated bushes with a liquid concentrate or a dry powder, and (5) applying dry pellets impregnated with a volatile toxicant to the soil about the base of small plants or crown sprouts.

Field tests on the chemical control of ribes were started in this country in 1917 at Hobart, New York. Chemical control has been under continuous study in the Far West since 1924, when the first trials were made on *Ribes petiolare* in north Idaho. Before 1946 sodium chlorate, ammonium thiocyanate, ammonium sulfamate, diesel oil, and a dry mixture of common salt and borax were used in practical control work (*5, 6*). Since 1946, 2,4-D and 2,4,5-T have become generally accepted as the most economic and practical herbicides (*7*). Developmental work of the past 10 years showed that all ribes native to white pine forests of this country can be killed by either 2,4-D or 2,4,5-T if dosage, concentration, and method of application meet prescribed requirements. In some forested areas these selective herbicides offer several advantages over those used before 1946.

Advantages to Use of 2,4-D and 2,4,5-T in Forest Areas

Safe to use.—2,4-D and 2,4,5-T are outstanding among the known herbicides with respect to safety from poison and fire hazard. They are noncorrosive to equipment and in practical use entail no poison hazard to man, fish, or wildlife and no fire hazard to the forests (*3*).

Effective in low dosage.—By comparison with contact weedkillers or those that must be absorbed through the soil, 2,4-D and related compounds, if they kill at all, are effective in low concentrations and moderate dosages. Thus the required chemicals can be readily transported over rough terrain and into remote areas not accessible by truck roads. Broadcast application by heavy duty ground rigs, or by aircraft where their use is feasible, is simplified by the comparatively small bulk and light weight of herbicide needed to spray an area.

No significant poisoning of soil.—2,4-D and 2,4,5-T are used most often as systemic toxicants applied to the vegetative parts of plants. In forested areas the residual and toxic effects of 2,4-D and 2,4,5-T in the soil may be disregarded except for transient action on seed or seedlings of highly susceptible plants shortly after spraying. 2,4-D disappears or is inactivated more rapidly in burned soils or in heavy organic rich soils than in light sandy soils (*4*); also it is less stable in warm, moist soils than in cool, dry ones (*1*).

Conifers not highly susceptible.—Considerable selectivity in toxic action of 2,4-D and 2,4,5-T exists between broadleaf plants and grasses, between sensitive broadleaf plants and most conifers, and among various broadleaf woody plants. Although seedling conifers can be seriously damaged or killed by careless application of 2,4-D or 2,4,5-T to associated ribes, this damage can be minimized in several ways: (1) Use the dilute water soluble salts or the emulsifiable acid of 2,4-D. (2) Adjust the concentration of spray to take fullest advantage of the high susceptibility of ribes. (3) Use a spray nozzle of the smallest capacity compatible with efficiency of spraying. (4) Choose the time of year when growth stages of ribes and associated plants reflect widest differences in sensitivity to the herbicide. (5) Adjust the amount of spreader in the spray solution to minimize wetting of plants (e.g. conifers) other than ribes.

State Regulations and the Use of 2,4-D and 2,4,5-T

Many states regulate the use of 2,4-D, 2,4,5-T, and related herbi-

[1]Plant pathologists, California Forest and Range Experiment Station, Forest Service, U. S. Dept. Agric. The Station is maintained at Berkeley, Calif., in cooperation with the University of California.

[2]Forester, Division of Blister Rust Control, Region 1, Forest Service, U. S. Dept. Agric.

[3]The generic name Ribes and the common name "ribes" are used to indicate currants and gooseberries.

cides under some type of agricultural code. Where crop plants might be damaged through drift or volatility of the toxicant, restrictions are placed on the operation of aircraft and the use of herbicides containing the short-chain or volatile esters. Pellets impregnated with volatile 2,4-D ester as described later in this report should not be used without first checking state regulations. The salts and low volatile esters of 2,4-D and 2,4,5-T are usually not restricted by state regulations on forest land except where sensitive crops would be close enough to be damaged by drifting spray.

Scope of Work by Regions

Chemical methods are more important in the blister rust control program than is indicated by the acreage treated. Even in the Far West, where chemical methods have been most extensively used, there have been few years when the acreage treated by chemicals exceeded 2 percent of that worked by pulling and grubbing. Of 111,186 acres worked in California by all methods in 1948, only 1,242 were sprayed. Nevertheless, at an expenditure of only 3 to 4 percent of the total man-days, an estimated 3 million ribes plants were sprayed, which was 29 percent of the year's total for all methods of eradication.

Since 1946 the acreage worked by 2,4-D and 2,4,5-T in the several white pine regions has varied considerably. In north Idaho and the northern Rocky Mountains a high level of activity has been maintained each year (average 2,932 acres) for the past eight years; in California the 10-year average of 1,560 acres has been sharply reduced since 1953. In the Northeast practical work was started in 1953 and has averaged 1,150 acres per year. Work in the North Central Region, also started in 1953, has averaged 2,457 acres per year and is increasing each year.

Table 1 compares the acreage treated and the time and gallons of spray applied by chemical methods in the two western regions. Differences in man-days and gallons per acre in the two regions are attributed in part to the number of ribes per acre and the size of bushes and in part to the broadcast spraying of ribes sites in north Idaho. Spray work in California has been selective and directed primarily to individual plants.

TABLE 1.—RIBES CONTROL ACCOMPLISHED WITH 2,4-D AND 2,4,5-T ON BLISTER RUST CONTROL AREAS IN TWO WESTERN REGIONS

Items	Idaho and Northern Rocky Mountain region	California region[1]
Period of years	1948-1955	1946-1955
Man-days of work	35,908	15,865
Acres treated	23,459	15,602
Ribes per acre	515	987
Gallons per acre[2]	123	144
Man-days per acre	1.53	1.02
Pounds acid (D or T) per acre	1.85	1.20

[1]Includes some work in southern Oregon.

[2]On the basis of estimated number of ribes treated and gallons of spray solution used, about 4 ribes (Idaho and northern Rocky Mountain) and 7 ribes (California) were treated with each gallon of solution.

Hand eradication costs for dense populations of old ribes have always been high. Before 2,4-D and 2,4,5-T were available, work on many dense populations was deferred or the area eliminated from control units in California. Much of this work has now been done, and the control program in California has about caught up with old logging and other old forest disturbances. In the western white pine type of north Idaho herbicides are extensively used for killing large populations of small, young ribes on recent cutovers and on recent burns where hand eradication would be tedious, ineffective, and expensive.

Factors Affecting the Choice of 2,4-D or 2,4,5-T for Ribes Control

A first look.—The field supervisor must consider several factors before he can wisely decide to use 2,4-D, 2,4,5-T, or a mixture of the two for any specific control job. Relative economics and advantages of chemical methods and physical methods must be reconciled. 2,4-D usually sells for about half the price of 2,4,5-T. Other factors are more difficult to assess: species reactivity, age, growth form, and seasonal development of plants, formulation, concentration and dosage needed, size of the job, and type of treatment.

Each species a new problem.—A meaningful appraisal of the toxicity of 2,4-D and 2,4,5-T to the various species of ribes is best provided by the reactions of foliage sprays. Twenty-two species of ribes of major concern to control have been classified to show susceptibility to 2,4-D, 2 4,5-T, or mixtures of the two (Table 2). Some ribes that require 2,4,5-T for satisfactory kill by foliage spray can be killed with 2,4-D applied by the basal stem or decapitation method.

Kill varies with age and vigor.—Seedling ribes and young vigorous plants are much more easily killed by herbicides than are mature bushes. General leafiness of a species or of a growth form within a species tends to increase susceptibility to foliage sprays. Within a species of ribes this "leafiness factor" commonly parallels age and vegetative vigor. As ribes populations mature—as bushes and stems get larger—the proportion of leaves to stems decreases. Old straggly ribes crowded by conifer reproduction or by other vegetation, and over-age decadent bushes with many auxiliary root crowns from layering stems, are particularly difficult to kill with a single chemical treatment.

As age increases the difficulty of chemical control of ribes populations, it may be desirable to (1) increase the concentration of herbicide, (2) add emulsifiable oil to the aqueous spray, (3) use mixed 2,4-D and 2,4,5-T in place of 2,4-D alone, (4) change the method of applying herbicide, or (5) plan the eradication in two or more treatments. In Idaho, for example, control areas infested with dense patches of brush and ribes are treated by broadcast sprays. This broadcast method is used for both large and small ribes. Ribes that survive broadcast spraying are easily found during a second working.

Sprouts from root crowns are a variation in growth form that should be recognized in the timing

TABLE 2.—RIBES OF ECONOMIC IMPORTANCE IN BLISTER RUST CONTROL PROGRAM, AND MOST EFFECTIVE AND ECONOMIC PHENOXY HERBICIDE FOR KILLING EACH SPECIES BY FOLIAGE SPRAY

White pine type	Ribes species	2,4-D	2,4,5-T	Mixtures of 2,4-D and 2,4,5-T
Eastern white pine (*Pinus strobus* L.)	americanum	X		
	cynosbati			X[1]
	glandulosum		X	
	hirtellum			X[1]
	hudsonianum	X		
	missouriense			X[1]
	oxyacanthoides			X[1]
	triste[2]		X	
Sugar pine (*P. lambertiana* Dougl.) and high altitude western white pines (*P. albicaulis* Engelm., *P. aristata* Engelm., *P. balfouriana* Jeffrey, and *P. flexilis* James)	binominatum		X	
	bracteosum	X		
	cereum[3]			X
	cruentum		X	
	lobbi		X	
	montigenum[3]		X	
	nevadense	X		
	roezli (northern form)			X
	roezli (southern form)	X		
	sanguineum		X	
	tularense		X	
Western white pine (*P. monticola* Dougl.)	inerme[4]		X	
	lacustre[5]		X	
	petiolare	X		
	viscosissimum		X	

[1]2,4,5-T alone is commonly used on these species in the North Central Region.
[2]Also in association with western white pine.
[3]Also in the western white pine type (California to Montana and British Columbia) and in the high altitude white pine types in Washington, Idaho, Montana, Wyoming, and Colorado.
[4]Also in upper reaches of sugar pine type.
[5]Also in eastern white pine type.

and method of chemical control. Leafy crown sprouts are much more readily killed than are old intact bushes. As a general practice sprouts should be retreated the second season after initial treatment. Sprouts may be treated the next year after spraying old bushes if rework is done late enough in the season to ensure that all surviving root crowns have become active.

Treat at the right time of year.—Effective use of 2,4-D foliage sprays is often restricted severely by seasonal plant development. 2,4,5-T is similarly affected although to a lesser degree, particularly in regions that receive summer rainfall. In the central Sierra Nevada of California, for example, the effectiveness on *R. roezli* of spray containing the sodium salt of 2,4-D at a concentration of 500 ppm. acid equivalent[4] falls off markedly about the first week in July. In Idaho, however, foliage spraying of *R. lacustre* and *R. viscosissimum* with 2,4,5-T at concentrations of 1,500 to 1,800 ppm. can be continued without seriously lowered effectiveness until the middle of August. Thereafter, if the concentration of 2,4,5-T is increased to 2,100 ppm. and if the spray solution is "fortified" with 3 to 5 percent of stove oil emulsified into the aqueous solution, spraying can continue into late fall.

The effectiveness of basal stem and decapitation treatments of ribes tends to follow the seasonal pattern of foliage sprays, but both of these methods will give satisfactory kill at any time of the year if the root crowns are generously treated.

Ribes bushes can be sprayed too early in the season as well as too late. Primary leaves should be fully expanded before foliage spraying is started in the spring.

Seasonal development of a ribes plant or population varies from one year to another and by species, age, and growth form. Habitat factors such as altitude and direction and steepness of slope also affect seasonal development. Young ribes plants can be effectively sprayed later into the summer than older plants, and ribes seedlings commonly can be sprayed whenever they have a good complement of leaves. At the start of a spray season on a specific area, bushes in shade may be almost dormant while those in open sunny areas are in a susceptible growth stage. At the end of the season, ribes in cool moist sites may be susceptible to foliage spray after ribes in dry situations can no longer be sprayed effectively. The best field measure of seasonal susceptibility is the degree of growth activity and the general leafiness of the plant or population.

Use the right product and diluent.—The principal types of commercial 2,4-D and 2,4,5-T weedkillers are: (1) acids, (2) sodium salts, (3) amine salts, (4) short-chain ("volatile") esters, and (5) long-chain ("low volatile") esters. With the exception of the sodium and ammonium salts of 2,4-D, which are dry powders, the common commercial formulations of 2,4-D, 2,4,5-T, and brush-killer mixtures of the two are liquids which contain a specified number of pounds of the effective acid per gallon.

Sodium and amine salts of the phenoxy herbicides are soluble in water but not in oil. Commercial formulations of these salts can not be used with any oil. The ester and acid formulations are commonly compounded in an oil base and can be diluted with either oil or water.

Formulations may differ significantly in rapidity of damage to leaf tissue. The rapidly damaging formulations are often satisfactory on resistant plants but may actually be less effective than the slower acting formulations on highly susceptible plants.

The phenoxy herbicides are used in low concentrations of 250 to

[4]Throughout this report dilute concentrations of 2,4-D and 2,4,5-T are shown in ppm. (parts per million) acid equivalent. Concentrated solutions (more than 1 percent) of these herbicides used for basal stem and decapitation methods are given as pounds of acid per hundred gallons (AHG). The acid equivalent (AE) is shown on the manufacturer's label, which usually gives the pounds of acid per gallon of stock solution.

3,000 ppm. in foliage sprays. In this method the dosage is automatically increased, as it should be, according to the size of the plant. Considerable variation is permissible in the concentration of the active ingredient, provided a generous volume of spray is used. The minimal concentration of 2,4-D when used as a single toxicant is usually much lower (250-500 ppm.) than that needed for 2,4,5-T (1,500-3,000 ppm.).

For late season and dormant season spray work, ribes are sprayed with a more concentrated solution (2,500 to 10,000 ppm.) than that used during the active growing season. The herbicide may be applied in oil or in a water-oil emulsion. Some commercial formulations of phenoxy herbicides are compounded so that 5 to 10 percent of fuel oil can be emulsified into aqueous spray solutions with ester concentrations of 2,000 to 3,000 ppm. Additional emulsifier material will be needed with many current products, however, if more than 1 or 2 percent of fuel oil is added.

The basal stem treatment of ribes is made with an oil solution containing 5 to 25 pounds AHG (acid per hundred gallons) of the esters of phenoxy herbicides. The diluent usually recommended for basal stem work on ribes is diesel oil. Several of the major petroleum oil companies supply weedkilling oils which are byproducts obtained from refinery processes. These weedkilling oils, because of their considerable content of aromatic (benzene-ring) petroleum fractions, are better solvents for the esters of phenoxy herbicides than are the aliphatic (straight-chain) petroleum constituents. The aromatic oils also may penetrate plant bark better and faster than the aliphatic oils. Weedkiller oils cost about the same as diesel oil but are not so readily procurable.

Plants prepared for decapitation treatment are severely damaged before the herbicide is applied, and solutions used to treat decapitated ribes need not be as concentrated as basal-stem solutions. Solutions containing 5 pounds AHG are strong enough for most ribes. Considerable quantities of dry salt-borax mixture are still used in the northeastern region.

FIG. 1.—Conventional plunger type power sprayer with 500 gallon tank mounted on 4-wheel drive truck. This unit can supply ten nozzlemen using the orchard type guns shown here. Each sprayman works a strip marked by string lines and handles 500-800 feet of ¼-inch or ⅜-inch hose as a lateral from the ½-inch main line.

Field Methods and Equipment

Foliage spray most useful.—Spray application of dilute aqueous solutions or suspensions of 2,4-D or 2,4,5-T to ribes leaves, stems, and root-crowns is by far the most widely used field method. For a single job, crew organization and equipment may vary from one worker carrying a small pump-up garden sprayer to a crew of eight to ten men using a truck-mounted power sprayer drawing on a 500-gallon tank (Fig. 1). In the latter case, besides a foreman-engineer and four to six nozzlemen, the crew may include a tank-truck driver to haul water and an additional man who lays hose and marks work lanes with string. A crew of this size works on large acreages of ribes reasonably close to water and to roads or truck trails.

For effective coverage and minimum loss by run-off from foliage and by drift, hose pressures and nozzles should provide a spray that can be classed between a mist and a drizzle. Orchard-type spray guns, which are continuously adjustable from a thin, hard stream to a fog, are effective for broadcast spraying of ribes and brush and for treatment of large dense populations of ribes. Spray guns should be used with caution, however, if damage to associated vegetation is of any concern. Excessive pressure from motorized spray rigs wastes solution and tends to blow the spray off the treated ribes. All aerial parts of plants, especially current-season branch tips, must be sprayed just to the point of drip. The objective is to "hang" the maximum amount of spray material on the plants. An unsprayed branch or branch-tip often means the survival of a bush. All sizable plants must be sprayed from at least two opposing directions.

Most ribes develop a crown between shoots and roots which may support many dormant adventitious buds (Fig. 2). Common field practice is to drench thoroughly the stem bases and root crown of a ribes before the leaves and stems are sprayed.

Small jobs and jobs in relatively inaccessible areas may be done with 2- to 5-gallon backpack tanks equipped with trombone-type hand pumps or with high-pressure backpack units called Hi-Fog guns. The unit shown in Figure 3*A* has been used by blister rust crews in the Rocky Mountain, Northwest, and

FIG. 2.—Chemical must reach this critical zone about the periphery of the root-crown to prevent sprouting. Note how the adventitious buds are protected by the form of the root-crown and stems.

Pacific Coast regions for many years and has proved to be dependable and convenient under a wide variety of field conditions. The Hi-Fog gun shown in Figure 3*B* is favored for work in high elevation white pine sites of national parks. Here work is often done at 8,000 to 10,000 feet elevation where the low-volume, high-pressure unit (3*B*) reduces to a minimum the load that must be carried in steep rocky terrain.

Portable power sprayers first devised and tested in north Idaho some 30 years ago have recently been improved and adapted to the needs of new herbicides. The unit shown in Figure 4 was developed by J. F. Breakey and J. C. Gynn (U. S. Forest Service) and has been used most extensively for ribes suppression in national parks of the northern Rocky Mountain region. Similar equipment has had limited use in northern Idaho and California.

Particularly difficult to kill with one treatment are: tall straggly ribes plants, sparsely foliaged plants, suppressed ribes in dense brush vegetation, clumps of old bushes with many root centers, and ribes with vine-like running and rooting stems. In such cases extra care should be taken to wet all foliage, all growing points, and all basal-stem and root-crown tissues to the point of drip.

Markers helpful in field work.—Ribes bushes recently sprayed with water solutions of phenoxy herbicides look much the same as unsprayed ribes. Definite symptoms of damage may not show up for several days, and even when damage can be seen, distinctions among resistant foliage, missed foliage, and inadequately treated foliage are difficult to make.

One percent or more of spray oil, or other emulsifiable oil, in the aqueous spray solutions gives a frothy, milky appearance to sprayed foliage for a few minutes. A more permanent marker is provided by inert light-colored powders. Insoluble materials leave a thin, splotchy deposit on sprayed parts. Of the several materials tested and used in California as markers, the brilliant white titanium dioxide pigments have been the most satisfactory. The material now used is "Titanox A-WD," a product of Titanium Pigments Corporation. It is an exceedingly fine powder of titanium dioxide treated to be instantly dispersible in water. In power equipment at rates of 0.5 to 0.8 pounds per 100 gallons of spray, this water-dispersible pigment causes no appreciable trouble in pumps, valves, hoses, or nozzles. Grades of titanium dioxide pigment other than the water-dispersible type cause too much trouble in spray rigs to be satisfactory. Titanox A-WD marks best in spray solutions made from the water soluble salts of 2,4-D. In sprays diluted from ester formulations of 2,4-D and 2,4,5-T and in aqueous sprays to which emulsifiable oil has been added in small amounts, the marker is less effective and tends

FIG. 3.—Backpack spray units used in areas remote from roads. *A*, On the left, a 4-gallon tank with trombone pump mounted on a pack board with a metal step. *B*, On the right, a 3 1/5-quart low-volume, high-pressure sprayer called a Hi-Fog gun; this unit is fitted with a hydraulic accumulator pump capable of developing 1,200 pounds per square inch pressure.

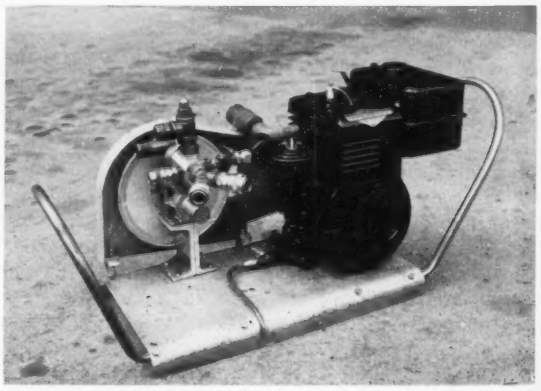

FIG. 4.—Portable power sprayer developed for high mountain and inaccessible areas. A 2½ h.p. air-cooled engine is belt connected to a 6 g.p.m., 200 p.s.i. gearless pump. Note three quick couplings for connecting hose lines and metal safety guard over the belt.

to form gummy residues in the equipment.

In north Idaho, where ester formulations of 2,4,5-T are used exclusively, superfine wood flour (Fig. 5) is preferred to the Titanox pigment. Wood flour is added to spray solutions in power rigs at the rate of 3 to 6 pounds per 100 gallons.

There is little uniformity in the use of markers for basal stem and decapitation work. Some supervisors maintain that the shiny color and strong smell of the oil diluents used in these treatments make it unnecessary to add dye or any other marker; others consistently add dye to the solutions. The marker generally used is an oil-soluble red dye "National Oil Red O" (Allied Chemical and Dye Corporation) at rates of a teaspoonful to a tablespoonful of dry powder per gallon of field solution. The dye can best be put into solution by thoroughly mixing the powder into a thin paste with a little oil before adding the main portion of the diluent oil. If the dye is properly mixed in the slurry stage, it all goes into solution in the oil and no difficulty is caused even in small orifice sprayers.

Basal stem treatment good any time.—In the basal stem treatment oil-ester solutions of 2,4-D or 2,4,5-T are applied just to the crowns and the lower parts of stems of intact plants. These solutions will kill or damage all kinds of plants, and treatment must be restricted as completely as possible to the ribes. The basal stem treatment is effective on all ribes species and is a more certain method of killing many of the ribes than is foliage spray. In Illinois, *R. missouriense* can be killed by basal stem treatment with 2,4,5-T during the dormant season when it is not practical to pull or grub ribes from frozen soil (*2*).

Careful use of the basal stem method usually results in 95 to 100 percent bush kill. Upright bushes with few large canes coming from an obvious root center are easiest to treat and to kill. The method is most advantageous on large bushes which are difficult to dig and on bushes of low vegetative vigor which are hard to kill with foliage spray. The method is also used to good advantage when scattered patches of sizable ribes occur in otherwise reasonably sparse populations and when appreciable populations of large ribes occur in areas inaccessible to power spray equipment.

Any device that will accurately direct and distribute a coarse spray or a solid stream can be used for basal stem work. For small plants and intermittent work, adequate pressure is provided by the mechanical hand oiler or by a small sprayer activated by carbon dioxide (Fig. 6). For large plants and bigger jobs, the 4- to 5-gallon trombone-equipped backpack tank shown in Fig. 3*A* is recommended.

A bush is prepared for basal stem treatment by scraping litter away from the base of the plant to locate and expose root centers and stem bases. A sufficient volume of oil and herbicide is applied to the crown of the plant and to the lowest 6 to 8 inches of all stems to wet the plant parts to the point of run-off. Sizable bushes are treated from at least two sides. The operator should walk around large bushes while treating them to insure complete coverage. The spray or solid stream is directed downward toward the root crown and stem bases to minimize drift and to prevent damage to associated plants.

Many large crowns have a sort of eaves overhang at ground level which may serve to protect the lowest adventitious buds on the crown (Fig. 2). To ensure kill of all canes, all of the top and sides of the crown must be wetted with oil solution to the point of run-off.

Herbicides for basal stem treatment are always diluted with oil. All washers and gaskets in the equipment must therefore be made of oil-resistant and chemical-resistant materials. Pressures used in basal stem work are low, 15 to 40 pounds per square inch. When a trombone pump is used, the nozzle is kept at the most effective spray level and the upper part of the

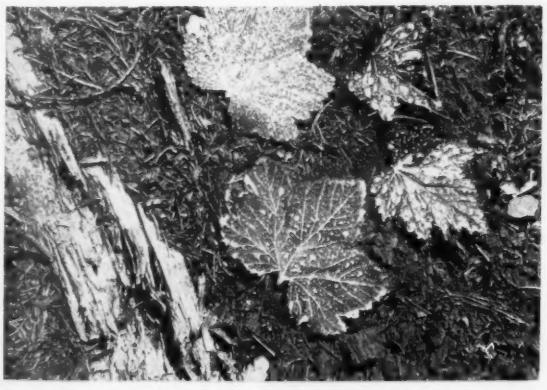

FIG. 5.—Superfine wood flour used as a marker in aqueous 2,4,5-T applied as a foliage spray. (*R. petiolare* leaves.)

FIG. 6.—Pint-size sprayer being used for basal stem treatment of *Ribes cereum*. 2,4-D in oil dilutent is sprayed by gas pressure developed from a carbon dioxide cartridge.

trombone pump is moved to develop pressure as required.

Decapitation supplements grubbing.—Ribes can be killed by cutting off all stems as close to the crown as possible and then by treating the freshly exposed crown and stem tissue with liquid or dry chemical. Remove duff and debris that cover the crown or may hide a layering stem. The method is definitely an auxiliary one in hand eradication work. It is used on large, rock-bound, or debris-bound bushes whenever they are difficult or costly to pull or dig. Cuts made through the crown of a decapitated bush are desirable because this will expose tissues of the crown to direct action of the herbicide. Herbicides in oil or water are applied to decapitated ribes bushes from a variety of hand applicators. Since the method is an auxiliary one, the equipment and chemical must not be burdensome to carry. A pocket size squirt-type oil can with a capacity of from 4 to 8 fluid ounces is suggested.

Volatile herbicides in pellets.—Tests in California have been in progress since 1951 with volatile esters of 2,4-D incorporated into dry clay pellets that can be broadcast onto the soil. This method can be effectively used only during periods of warm dry weather on active low-growing plants. Pellets containing about 20 percent by weight of a mixture of the methyl and ethyl ester of 2,4-D will kill young plants or crown sprouts of *R. roezli*, a species that is sensitive to low dosages of 2,4-D. The method is suited to treatment of patches of seedlings or scattered crown sprouts.

These pellets can be carried in a canvas or heavy paper bag and broadcast by hand. They can be dropped by fixed wing or rotary wing aircraft at prescribed dosage rates without danger of affecting or being screened out by trees and other vegetation that overtop ribes. The method offers another approach to the problem of selectivity because damage caused by the volatile constituent is restricted to the stratum of vegetation within a very few feet of the ground and to plants that are highly sensitive to low concentrations of the toxicant.

Application of 2,4-D pellets to young *R. roezli* on June 22, 1956, gave an apparent good kill from dosages of ½ pound or more per square rod, but further experimental work is needed to determine the scope and effectiveness of 2,4-D pellets in ribes suppression work.

Summary

In the Far West about 22,000 acres of forest land supporting heavy populations of ribes were sprayed once between 1928 and 1945. Most of this work was done with sodium chlorate along streams. For the same region, from 1946 to 1956 inclusive, 39,061 acres have been treated with 2,4-D and 2,4,5-T. Chemical methods of ribes eradication are used only under conditions where grubbing or pulling, the standard procedures, are less effective and more costly than the alternate chemical method.

In the North Central and Eastern white pine forests blister rust control supervisors have used chemical methods effectively for the past two years on troublesome patches of ribes within 5,635 acres.

Successful chemical methods have been devised for killing ribes by 2,4-D and 2,4,5-T applied as (1) aqueous sprays to the foliage and stems, (2) oil-extended sprays to the basal stems and root-crown, and (3) liquid or dry powder to the cut surface of plants decapitated at ground level. A new method, using dry clay pellets impregnated with a volatile ester of 2,4-D, looks promising but is still in the experimental stage. A water dispersible Titanox pigment, superfine wood-flour, and a red oil-soluble dye can be used as markers to aid field workers in doing a thorough job. Coverage and seasonal development, growth-vigor, and age of plants are the most important factors affecting the bush kill by a specific toxicant.

Each ribes species has constituted a special problem in the development of the most economic toxicant and the method of application and equipment to be used. Knapsack and portable power sprayers have been adapted to work under forest conditions and have received special attention in developmental work.

2,4-D and 2,4,5-T are advantageous herbicides in forest protection work because they are inexpensive, effective in small bulk or weight, non-inflammable, and non-poisonous to man, fish, and wildlife.

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Acknowledgments

Blister rust control is a cooperative project of state, federal, and private agencies. Control personnel from the several white pine regions have contributed significantly to the development of the chemical methods here reported. Space limitations require that acknowledgment of these important contributions be restricted to Glenn Allison, T. H. Harris, Benton Howard, H. N. Putnam, and H. E. Swanson, as blister rust control leaders, in five recognized white pine regions, and to W. S. Burrill who did the experimental work in California from 1946-56. Thanks are due the American Chemical Paint Company and the Dow Chemical Company for supplying experimental quantities of weed killers during the past ten years. The special 2,4-D ester pellets described in this report were obtained through the cooperation and interest of Robert H. Beatty, American Chemical Paint Company.

Wound Healing and Defects Following Northern Hardwood Pruning

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THE PRUNING of coniferous species to produce high quality lumber has become an accepted practice throughout many areas of the United States. The application of pruning to hardwood species, however, is still in the early stages of development. No general agreement exists among foresters concerning the advisability of such practices. A portion of this controversy arises out of the difference in thinking as to just what hardwood pruning is. Those thinking in terms of conifer pruning visualize pruning a certain number of trees per acre to a specified height. This type of pruning is probably not applicable to hardwoods. A more realistic approach to hardwood pruning would be the improvement of quality of a small number of trees per acre which, because of a few low branches, or early forking, would not at maturity yield high-quality timber products. With this approach, the pruning would more closely resemble a surgical operation—individual trees would be selected for pruning only when the removal of a few branches would materially increase the resulting tree grade.

With this approach to hardwood pruning in mind, a project was initiated during the fall of 1956 to determine the effect of individual pruning wounds on tree quality. This consisted of a dissection study of healed hardwood pruning wounds.

Information was developed on: (1) the effect of artificial pruning on the establishment of decay organisms through wounds, (2) the importance of pruning live versus dead branches in relation to decay development, (3) healing rates for pruning wounds of various sizes for different species, (4) the effect of artificial pruning on the development of lumber defects, and (5) the importance of epicormic branches which may develop after pruning.

[1]Maintained in cooperation with the University of Minnesota, St. Paul 1, Minn.

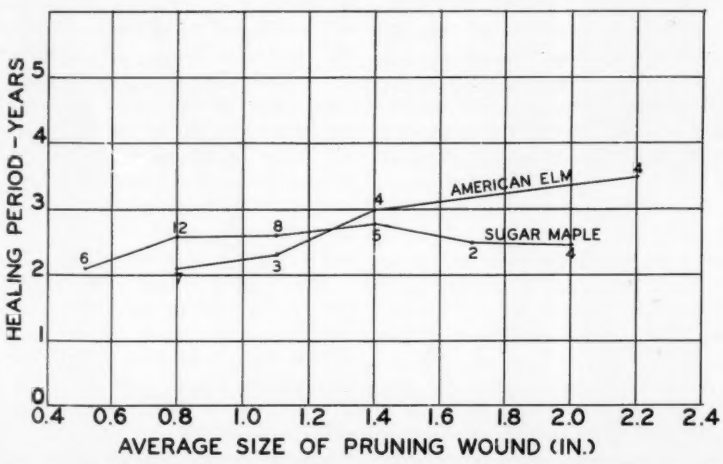

FIG. 1.—Period required for wounds of various sizes to heal (data combined by 0.3-inch classes).

Description of Pruning Treatment

The trees to be dissected were chosen from a large experiment established in 1938 by the personnel of the Nicolet National Forest and the Lake States Forest Experiment Station to determine the effects of thinning and pruning in young second-growth northern hardwoods.[2] In an 11-year-old stand growing on a good site, between 320 and 400 crop trees per acre were selected from the trees of good form, preferably in the dominant or codominant crown classes. These crop trees were pruned and then released by removing all trees within either 2½ or 5 feet of their bases. At the time of treatment, the stand averaged 2,810 trees per acre 0.6 inch and over in diameter; dominants averaged 2.0 inches in diameter and 21 feet in height. The stand was predominantly sugar maple (*Acer saccharum* Marsh.) and American elm (*Ulmus americana* L.). Minor species included white ash (*Fraxinus americana* L.), eastern hophornbeam (*Ostrya virginiana* [Mill.] K. Koch), American basswood (*Tilia americana* L.), and black cherry (*Prunus serotina* Ehrh.).

In the original experiment, all of the crop trees were pruned to assure a large sample of pruning wounds. In normal practice, only a small portion of these trees would have qualified for pruning. Pruning was done to half the total height of the trees by means of saws with extension handles.

In conjunction with this study a series of detailed measurements and photographs were taken on 263

[2]Stoeckeler, J. H., and C. F. Arbogast. Thinning and pruning in young second-growth hardwoods in northeastern Wisconsin. Soc. Amer. Foresters Proc. 1947: 328–346, illus. 1947.

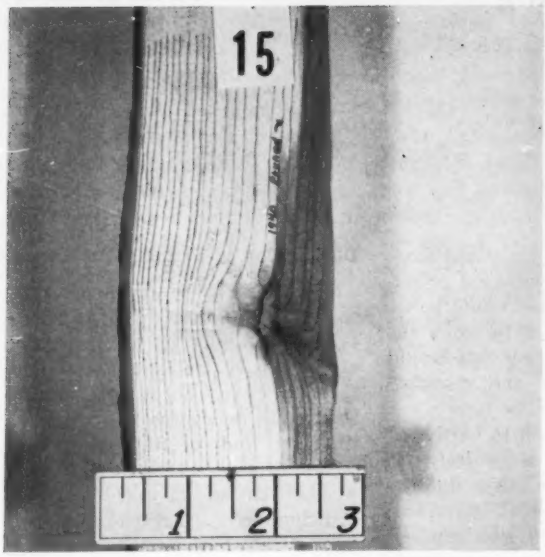

FIG. 2.—Artificial pruning of a live maple branch 0.5 inch in diameter. Note the rapid healing and resulting sound knot.

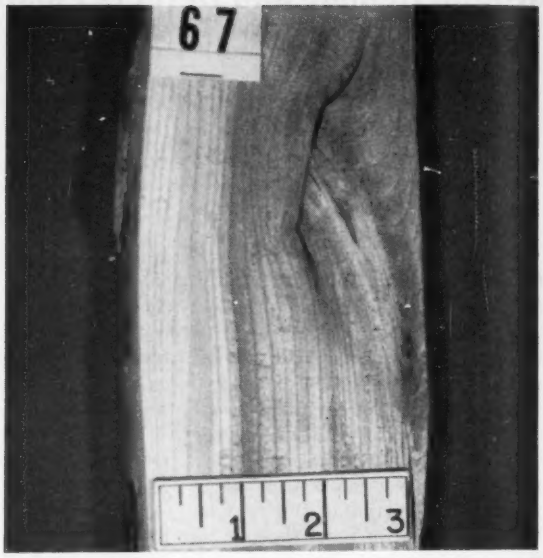

FIG. 3.—Artificial pruning in American elm. The live branch pruned in this instance was 1.8 inches in diameter. This wound was completely healed within 3 years.

pruning wounds from 118 trees. These data, taken over an 18-year period, provided the basis for the present study.

At the time of pruning, the following information was recorded: The diameter of limb, whether limb was dead or alive, size of wound after pruning, diameter of exposed heartwood, and presence or absence of incipient decay. Subsequent measurements were taken of healing rate and epicormic sprouting.

Selection of Sample Trees

Although several species of northern hardwoods were available, only sugar maple and American elm were selected for dissection. These two species showed indications of returning the largest amount of usable pruning information. Then, too, the study is a continuing one which would lose its value for the original purpose if too many trees were removed. A sample of 12 pruned and six unpruned trees of each species was cut. They had 114 pruning wounds. The present study depended more on the number and character of the wounds than on the number of trees. Therefore, in the selection of sample trees, an attempt was made to include sufficient wounds of each size and branch condition to indicate any significant differences. The unpruned sample trees were selected to correspond as nearly as possible to the pruned trees in both crown class and stem diameter.

In addition, 38 sugar maple and 18 American elm trees were selected at random to study the importance of any epicormic branches that had developed after pruning; these trees, of course, were not dissected.

Dissection of Pruning Wounds

After selection of the sample trees the individual pruning wounds were labeled so their identity could be retained throughout the dissection process. During September of 1956, the sample trees were cut and a 12-inch section of the bole surrounding each wound was removed. Photographs were then taken of the exterior characteristics of each wound. A radial cut was made through the center of each branch scar, exposing a side view of the wound healing process. Photographs were again made showing an interior view. This provided a complete photographic record of each wound from the time of pruning to the final dissection. Information was then obtained on the following wound healing characteristics: rate of healing, production of clear wood after healing, establishment of decay organisms, and formation of epicormic branches.

Results

The data showed no significant difference between the amount of decay present in wounds resulting from dead branch pruning and those from pruning live branches. Although several of the dead branches were more or less decayed at the time of pruning, this was sap-rot caused by secondary fungi and limited to the exposed wood in the wound. The decay did not advance into the adjacent parts of the stem as would be true if heart-rot fungi had become established before the pruned stub was occluded. This agrees closely with data presented by Roth[3] for white and black oak in Connecticut.

The effect of branch condition at the time of pruning on wound healing rates was rather minor. Live branch scars healed slightly faster than those from dead branches. The difference, however, was too

[3]Roth, E. R. The effect of pruning on the heart rot hazard in hardwoods. U. S. Bur. Plant Indus., 10 pp. (Processed.) 1939.

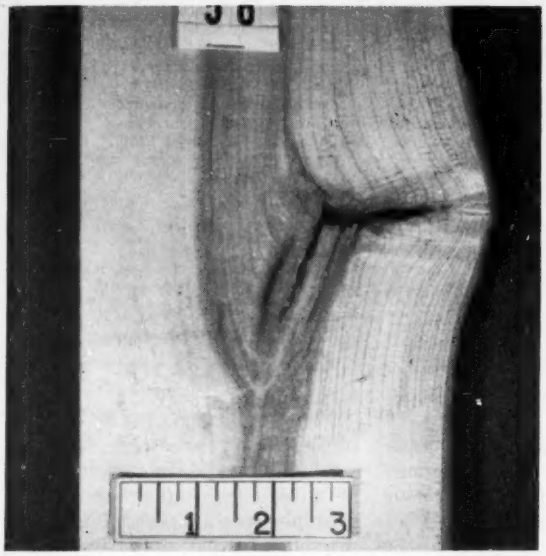

FIG. 4.—Natural pruning in sugar maple. Overgrown bark and a decay pocket have developed during healing. Defects of this type are frequently associated with branches protruding at an acute angle from the main stem. Although the decay in this branch was not a true heart rotter and was arrested after the wound healed, it did result in an unsound knot.

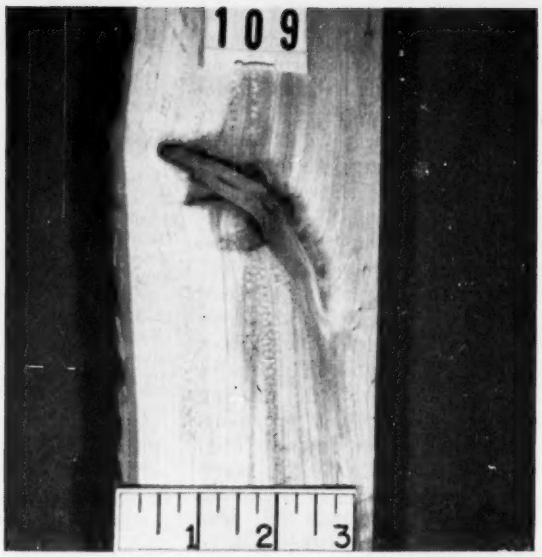

FIG. 5.—Natural pruning in American elm. A period of 14 years elapsed between the death of the branch and final wound healing. These dead branch stubs are eventually overgrown, but not until several years' growth of future lumber has been degraded.

small to be of practical significance. No relationship was found between artificial pruning of sugar maple and the development of stain adjacent to the wound area.

To determine whether wound healing rates were influenced by species and wound size, comparisons were made between elm and maple wounds of various sizes. As can be seen from Figure 1, healing rates on wounds up to 2 inches in diameter were practically constant regardless of species or wound size. Healing rates were strongly influenced, however, by tree growth rates and length of branch stub remaining after pruning. On those trees where the pruned branch stub extended ¼ inch beyond the bark, the period necessary for wound healing was increased by 1 to 3 years. The rapid healing of properly pruned branches is il-

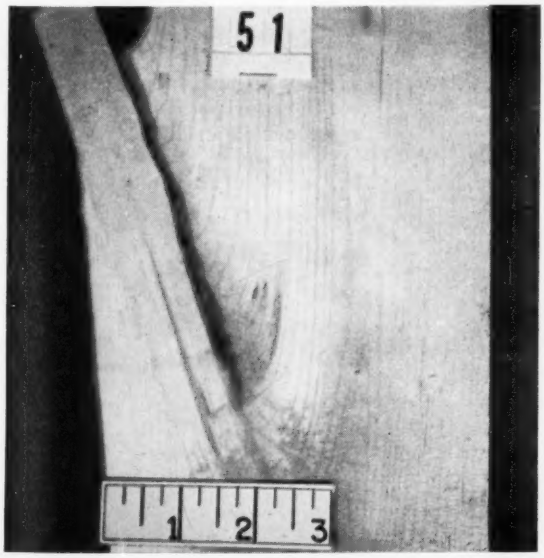

FIG. 6.—Live, unpruned branch of sugar maple. Note the ingrown bark that is developing. This type of branch frequently results in a weak crotch which eventually splits open.

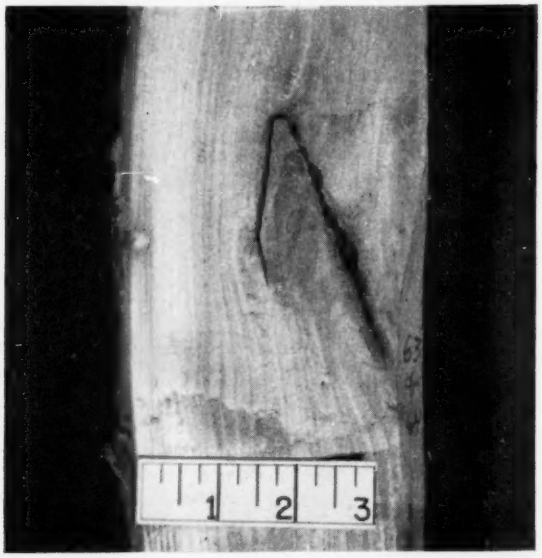

FIG. 7.—Artificial pruning of a live American elm branch similar to Figure 4. The resulting wound healed over within 2 years.

lustrated in Figures 2 and 3.

Tests were made to determine the effect of artificial pruning on the development of lumber defects. Tree sections from both natural and artificially pruned branches were compared. Naturally pruned branches showed a high proportion of typical lumber defects. The most important of these were relatively long, unsound branch stubs, overgrown bark, and local decay pockets. Some examples of these defects are shown in Figures 4, 5, and 6. In all dissections of artificial pruning wounds, however, little or no defects of these types had developed after pruning (Fig. 7). No heart-rot fungi were found in any of the artificially pruned branches. The branch scars had healed over in every case, providing only sound knots.

An analysis was made on 38 pruned sugar maple and 18 pruned American elm to determine the importance of epicormic branches which may develop after pruning. The results of this analysis show that in the dominant and codominant crown classes epicormic branching is a minor factor and for all practical purposes can be disregarded (Table 1). However, epicormic branching on suppressed and intermediate trees was very serious. On these trees, the effect of pruning has essentially been lost.

TABLE 1.—THE DEVELOPMENT OF EPICORMIC BRANCHES FOLLOWING ARTIFICIAL PRUNING OF SUGAR MAPLE AND AMERICAN ELM

Crown class 1956	Trees pruned 1938	Pruning wounds	Trees with epicormic branches 1956	Wounds with epicormic branches 1956	Total living epicormic branches 1956	Wounds with epicormic branches
	Number	*Number*	*Number*	*Number*	*Number*	*Percent*
			SUGAR MAPLE			
Dominant	6	10	1	1	1	10
Codominant	14	38	1	1	1	3
Intermediate	6	19	2	4	12	21
Suppressed	12	28	12	15	55	54
			AMERICAN ELM			
Dominant	14	36	0	0	0	0
Codominant	3	4	0	0	0	0
Intermediate	–	–	–	–	–	–
Suppressed	1	3	1	1	5	331

Conclusions and Summary

The results of this investigation indicate that artificial pruning in young northern hardwood stands has possible practical applications. Live branch pruning, rather than promoting decay as indicated by Mayer-Wegelin,[4] has resulted in rapid healing of all wounds under 2 inches in diameter. The importance of species and branch size on wound healing rates was not evident as long as the branch scars were under 2 inches. Healing rates of wounds larger than 2 inches would probably be influenced to some extent by wound size.

The necessity of pruning branches close to the bole was brought out emphatically during this study. Retention of even a ¼-inch branch stub resulted in a delay in wound healing of 1 to 3 years.

Lumber defects such as decay pockets, overgrown bark, and long unsound branch stubs were found in a high percentage of natural pruning wounds. Artificially pruned branches, however, developed none of these defects following pruning. In all cases the wounds had healed over, producing sound, tight knots, free of heart rot. In no instance was there any indication that artificial pruning encouraged the development of decay.

A careful study was made of epicormic branching which may develop after pruning. The profuse development of these sprouts could eliminate any beneficial effects of artificial pruning. On the study area, epicormic branching was not serious as long as pruning was confined to dominant and codominant trees. In many cases, however, the effect of pruning trees in the lower crown classes has been nullified by subsequent branching.

[4] Mayer-Wegelin, H. Astung (Pruning). Schaper, Hanover, Germany; U. S. Forest Serv. Translation No. 264 (trans. by C. P. de Blumenthal). 1936.

Maynard H. McCormick (1911-1957)

Maynard H. McCormick, 46, was killed in an automobile accident November 17, 1957. Mr. McCormick, who had been with the Bureau of Land Management for 17 years, was enroute to a new assignment in Coos Bay, Ore. at the time of the accident. He was being transferred from the Roseburg Forest District.

Mr. McCormick was born in Grand Lodge, Mich. August 5, 1911 and graduated from Oregon State College with a B.S. degree in forestry in 1940.

Evaluation of Several Organic Mulching Materials on a Sandy Loam Forest Nursery Soil[1]

Emmanuel T. Van Nierop
and Donald P. White[2]

IN THE MANAGEMENT of forest nursery soils the use of protective soil coverings or mulches is a well accepted approach to the problem of reducing soil moisture losses and controlling weeds. A large number of materials of both natural and synthetic origin have been used for this purpose and the choice of a particular substance which does the job is usually dependent on cost and availability.

In forest nurseries there has been a preference for natural organic materials which not only function as a mulch but which when added to the soil favorably affect both physical and chemical soil properties. In the Northeast and Lake States there is a preference for peat as a mulch because it is abundant and easily obtained. Outside of the region of glacial soils, and specifically in the southern pine region and Pacific Northwest, the use of locally produced sawdust or wood chips is increasing because these are less expensive than peat.

In some nursery areas, peat, sawdust, and chips are equally available but information is lacking as to which is superior for use as a mulch.

The present study compared the effect of two types of peat, a mixed hardwood-softwood sawdust and a softwood wood chip mulch on some of the physical properties and the faunal population of a sandy loam forest nursery soil (Palmyra series).

Location and Design of the Experiment

The experiment was established in the spring of 1955 on a portion of the transplant beds of the Experiment Station operated by the State University of New York College of Forestry at Syracuse. The use of some type of mulch is recognized as being necessary on this soil if satisfactory stock production is to be attained, especially since frost heaving is a problem.

Twenty square plots 8 feet on a side in a random block design were laid out in two parallel rows of ten plots each on an area that had been rototilled to a depth of 6 inches, raked level, and rolled. The rows were separated by a two foot isolation strip and in the rows a one and a half foot isolation strip separated the plots. The whole experimental area was enclosed by a fence (Fig. 1).

Treatments consisted of applying (1) no mulch, (2) wood chips, (3) sawdust, (4) reed-sedge peat, and (5) sphagnum peat. The sawdust and wood chips were applied at the rate of approximately 30 tons per acre and the sphagnum peat and reed-sedge peat at the rates of 7 and 12 tons per acre respectively. All weights were on a moisture free basis. Four replications of each treatment were randomly assigned to the plots. During the course of the study no trees were on the plots and they were kept free from weeds.

Measurements of soil moisture using plaster of Paris moisture blocks were made at 1 and 6 inch depths in each plot. Precipitation, air temperature, and soil temperature were also recorded.

Materials

The sawdust was obtained locally[3] and consisted of hardwood and softwood material in the ratio of 2 to 1. The wood chips were produced with a Fitchburg Chipper[4] at the Experiment Station from spruce and larch thinnings of an average of 5 inches d.b.h. The reed-

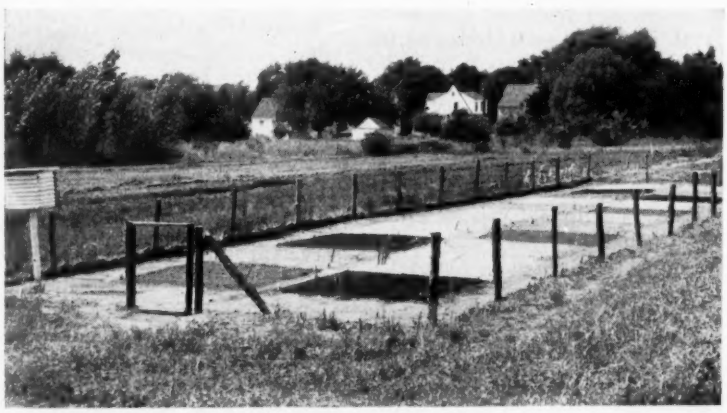

FIG. 1.—Layout of organic mulch plots at College of Forestry Experiment Station, Syracuse, New York. Note wide variation in color of materials; darkest plots are reed-sedge peat.

[1]Part of an M.S. thesis prepared by the senior author in the Department of Silviculture, State University of New York College of Forestry at Syracuse, N. Y., June 1956.

[2]Engineer, Ontario Water Resources Commission, and associate professor of forestry, Michigan State University, East Lansing.

[3]Booher's Lumber Co., Nedrow, N. Y.

[4]Through the cooperation of Professor L. S. Hamilton, Dept. of Conservation, Cornell University.

TABLE 1.—REACTION, ABSORPTION CAPACITY AND COST OF MULCHES

Mulch	Before application			At end of study period				
	Reaction	Water absorption capacity		Reaction	Water absorption capacity		Cost	
	pH	*Percent* by wt.	*Inches*	pH	*Percent* by wt.	*Inches*	*Per ton*	*Per 100 sq. ft.*[1]
Wood chips	3.5-3.8	273	0.43	4.9-5.3	270	0.43	$ 12.—	$0.49
Sawdust	5.0-5.1	300	0.48	5.7-5.9	330	0.52	$ 17.—	$0.69
Reed-sedge peat	5.4-5.7	600	0.72	5.4-5.8	590	0.77	$ 60.—	$1.80
Sphagnum peat	3.3-3.6	976	0.70	4.6-5.8	960	0.70	$110.—	$2.29

[1]For layer of one inch thickness.

sedge peat came from Geneva, New York and the sphagnum peat was produced in Canada. Some properties and the cost of the various mulching materials are shown in Table 1.

If the mulches are selected on the basis of their cost alone, it is obvious that the wood chips and sawdust are considerably more economical than the peats and only a superior performance of the latter materials would justify their use as a protective cover.

Measurement of Mulching Influences on Soil Properties

At intervals of three to five days from mid-June to mid-September resistance readings were made with the modified resistance bridge, mostly between 10 a.m. and 3 p.m. No resistance readings were taken within 24 hours after a rainstorm. Further measurements included the determination of field capacity, wilting percentage, and soil temperatures at 1 inch and 6 inches below the surface.

During the early part of October soil samples were collected on the plots for the determination of volume weight, percolation rate, water stability of soil aggregates, and for a census of the earthworm and nematode populations. In addition the surface layer of each plot was tested for reaction and organic matter content. Sampling locations were selected at random using a grid system.

Results

The variations in soil moisture under the influence of the different soil mulches at the 1 inch and 6 inch level are shown in Figure 2. Precipitation as well as moisture level at wilting and field capacity is also shown on the same graph.

Soil and air temperatures as influenced by the various mulches are shown in Figure 3.

The volume weight, percolation rate, water stability of soil aggregates,[4] reaction, and organic water changes as influenced by the mulches are summarized in Table 2.

Census of Faunal Population

The earthworm population comprising primarily *Helodrilus caliginosus*, Savigny and a few *Lumbricus rubellus*, L. was determined by counting individuals in a one square foot area 6 inches deep. The nematodes in the upper 2 inches of soil were counted by a technique essentially as described by Overgaard (*9*).[5]

The relative numbers of earthworms and nematodes as affected by the soil mulches is reported in Table 3.

Discussion

Soil moisture.—The apparent superior soil moisture conserving qualities of the wood chips and the sawdust over the peats is partially explained by the somewhat greater depth (1½ inches vs. 1 inch) to which the wood chips and the sawdust were applied. The difference was increased by the variation in relative stability of the materials. As the summer progressed the sawdust and the wood chips compacted to a firm mat, thereby becoming more effective as a protective soil cover. On the other hand the peats showed a tendency to blow away easily on account of their low specific gravity upon drying. This instability became quite clear towards the end of the summer when the peat plots showed small patches from which the mulch was entirely removed. The physical instability of the peats suggests that these materials are less suitable than the wood chips or sawdust as mulches. The removal of the mulch may further have serious economical implications. As a result of improved soil moisture conditions created by the mulch, root development of transplant stock is stimulated in the surface layer of the soil. These roots may be injured or killed by drought when the soil becomes exposed as a result of the loss of the protective cover.

On the basis of physical stability alone, the conclusion is that the wood chips and the sawdust are superior to the peats as mulching materials for the conservation of soil moisture. Temperature measurements (Fig. 2) show that the peats are less effective than the wood residues in protecting the soil against solar radiation. This can be accounted for by the relatively darker color and the thinner application of the peat mulches. It is therefore probable that the peat plots suffered additional moisture losses because of their greater heat absorption.

The relatively larger size of the wood chip particles is associated with larger voids. As a result an exchange of soil air with that of the atmosphere by diffusion is facilitated. Sawdust, on the other hand, is more compact so that in spite of the larger total pore volume such an exchange of air is impeded. In addition, this stagnating effect tends to keep the air in the sawdust at a nearly equal vapor pressure as that of the atmosphere so that soil moisture conservation is further enhanced.

The slightly lower moisture retention under the sphagnum peat than under the reed-sedge peat could also be attributed to differences in physical properties of these materials. Sphagnum peat, a fibrous material, showed tendencies to stick together in small

[5]Professor LeRoy Stegeman gave valuable advice in the sampling and identification of soil fauna.

patches during dry periods following heavy rains. These patches became separated by wide cracks which exposed the bare soil, facilitating evaporation. Reed-sedge peat on the other hand is a more finely divided material and did not show the cohesive qualities of the sphagnum peat.

At 6 inches below the surface, soil moisture was consistently higher in the sawdust and the wood chip plots than in the peat plots. It is assumed that the increased rate of evaporation from the peat plots created a vapor pressure gradient towards the upper soil layer, resulting in an upward movement of water vapor.

Faunal populations.—The mulches apparently favored an in-

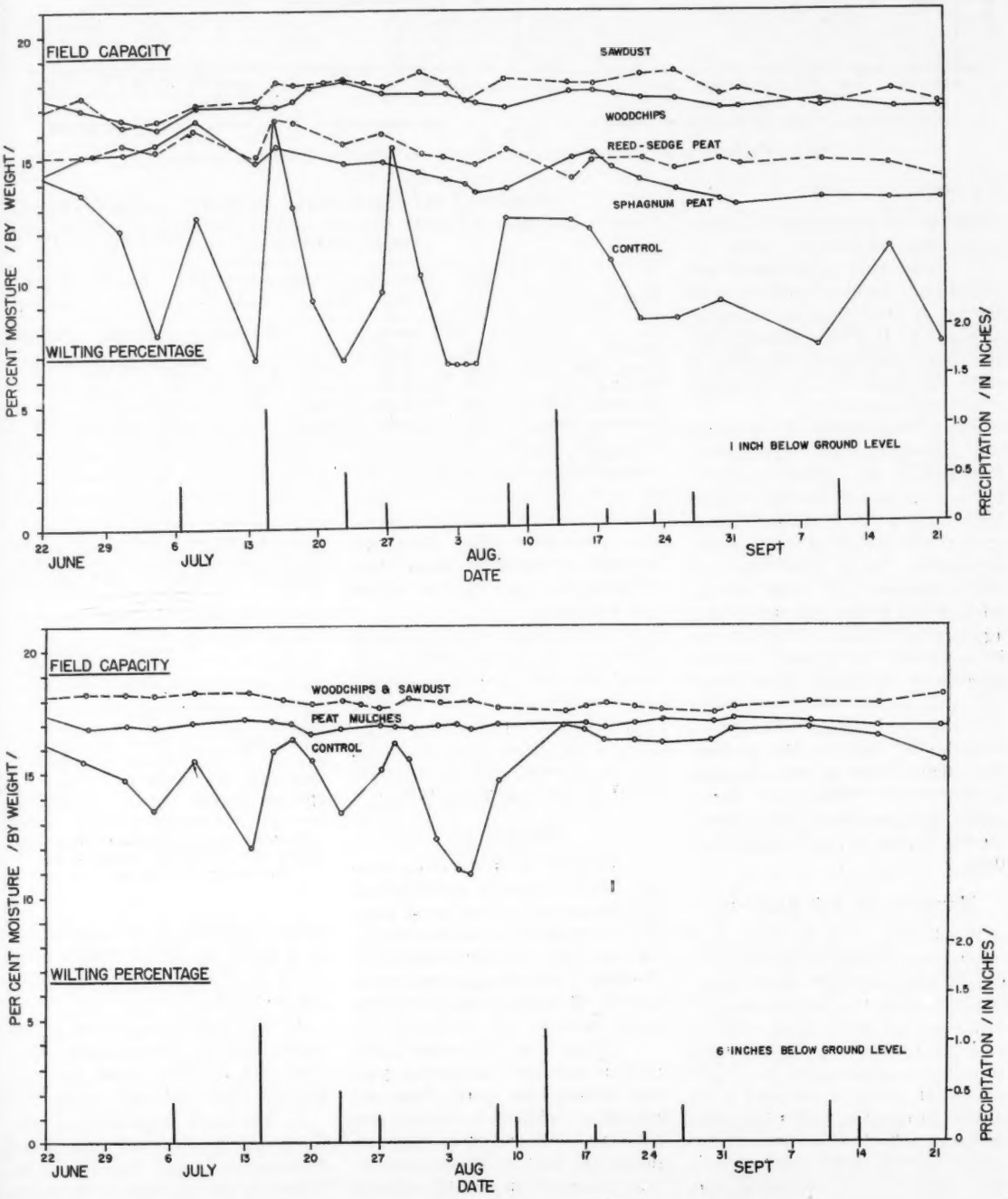

FIG. 2.—Variation in soil moisture under the influence of different mulches.

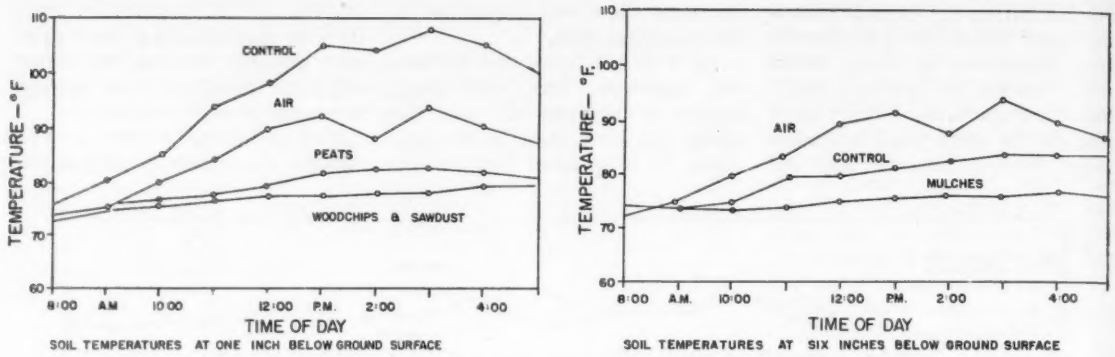

FIG. 3.—Variation in air and soil temperatures under the influence of different mulches.

crease in the populations of earthworms and nematodes. Their increase was more pronounced and found to be highly significant with the use of wood chips and sawdust as a mulch. It is also probable that the heat insulating capacity of these materials was also concerned with their increase.

The water stability of the larger soil aggregates was significantly increased in the sawdust plots. It has been pointed out by various investigators that earthworms promote the formation of water stable aggregates (*5, 6*) and that soil micro-organisms also play an important role in the processes of soil aggregation. However, the increase in nematode population is not necessarily desirable since there are indications that nematodes are closely associated with the occurrence of root rot in nursery transplant stock as was observed by Berch (*3*). Wilde (*10*) found nematodes associated with damping-off disease of coniferous seedlings.

Nitrogen and Soil Reaction

Wood chips and sawdust tend to depress available nitrogen (*7, 8*). It may therefore be necessary to accompany the continuous and heavy use of these wood mulches with an application of a nitrogen fertilizer. Approximately 20-25 pounds of elemental nitrogen is required to counteract the nitrogen-depleting effect of a ton of dry wood chips or of dry sawdust (*1*). The additional cost (approximately $3.25/ton of dry mulch) does not appreciably alter the very favorable economy of using these materials over the expense of the peat mulches.

It is interesting to note that all mulching materials, except the reed-sedge peat, were significantly less acid after one season's weathering. However, the leaching of organic acids from these materials had no important effect on the reaction of the underlying soil.

TABLE 2.—INFLUENCE OF ORGANIC MULCHES ON SOME PROPERTIES OF A SANDY LOAM FOREST NURSERY SOIL

Treatment	Vol. wt.	Percolation rate	Aggregate stability 3 mm.	2 mm.	1 mm.	Reaction	Organic matter[1]
		cm/m		*Percent*		pH	*Percent*
Control	1.34	0.42	26.0	6.5	12.0	7.9-8.2	3.3
Wood chips	1.32	0.75	20.1	7.2	10.9	7.9-8.0	3.4
Sawdust	1.45	0.49	47.4*	5.2	9.1	7.7-7.9	3.6
Reed-sedge peat	1.34	0.38	21.6	5.5	11.5	7.6-8.0	3.8
Sphagnum peat	1.40	0.56	16.1	9.4	16.1	7.6-8.0	3.4

[1]Loss on ignition
*Significant at 5% level of t

TABLE 3.—RELATIVE NUMBER OF EARTHWORMS AND NEMATODES UNDER VARIOUS MULCHES AT END OF ONE GROWING SEASON

Treatment	Earthworms (per 0.50 cu. ft.)	Nematodes[1] (population index)
Control	1.0	4.5
Wood chips	5.0**	18.5**
Sawdust	6.2**	22.0**
Reed-sedge peat	1.0	5.2
Sphagnum peat	3.3	6.2

[1]Relative numbers based on suspension counts from upper two inches of soil.
**Significant at 1 percent level of t.

Conclusions

1. Greater thickness of application, better physical stability and heat insulation of the wood chips and the sawdust in contrast to the peat mulches were main factors in effecting a greater moisture retention in the plots treated with the wood residues.

2. There is no important difference in moisture conserving qualities between the wood chips and sawdust; neither is there any difference between reed-sedge *vs.* sphagnum peat in this respect.

3. Sawdust apparently effected a highly significant increase in water stability of soil aggregates as a result of the relatively more rapid decomposition of this mulching material.

4. Soil acidifying effects of organic mulches, particularly sawdust, are probably much less important than commonly supposed.

5. The wood chips and the sawdust mulches created conditions favoring a highly significant increase in the population of earthworms and nematodes.

6. Within the limitations of this study, the stability and the low cost of the wood chips and the sawdust in contrast to the instability and the high cost of the peat mulches commends the use of the wood residues as more desirable.

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Salt-Water Storm Damage to Loblolly Pine Forests

S. Little, J. J. Mohr, and L. L. Spicer[1]

SALT WATER periodically damages the low-lying forests, principally of loblolly pine (*Pinus taeda* L.), along the eastern shore of Chesapeake Bay in Maryland. During hurricanes or other severe storms salt water may be driven inland in large enough quantities to damage these forests in two way—through spray carried by the wind, and through inundation by storm waves or tides.

There have been several papers describing similar damage in New Jersey and New England, particularly to stands of Atlantic white-cedar (*Chamaecyparis thyoides* [L.] B.S.P.) and swamp hardwoods (*1, 2, 3, 5, 6, 7, 8, 9*).

However, very little has been published on the damage to loblolly pine-hardwood forests of Maryland, Virginia, and the Carolinas. Wells and Shunk (*10*) surveyed the vegetation in the spray zone at certain points in the Carolinas, and concluded that loblolly pine was the most sensitive of all arborescent species surviving in this zone. The four other woody species persisting in their spray zones were eastern baccharis (*Baccharis halimifolia* L.), yaupon (*Ilex vomitoria* Ait.), waxmyrtle (*Myrica cerifera* L.), and live oak (*Quercus virginiana* Mill.). Wells and Shunk also found that immature needles of loblolly pine are more susceptible than mature ones. Both they and other authors report that damage from salt-spray deposits is soon noticeable, since the foliage when sufficiently coated is dying or dead within a month, sometimes within a few days (*4, 7, 10*).

Recent damage from both salt-spray deposits and flooding with brackish water was observed along the Chesapeake Bay on Maryland's eastern shore. The cause, extent, and location of both types of damage, as well as the relative susceptibility of different species, are briefly discussed in this note.

Spray Damage

Salt-spray damage usually occurs as a result of relatively dry storms, those with high winds and little precipitation. For example, Hurricane Hazel on October 15, 1954, brought only 0.68 inch of precipitation to Church Creek, Maryland. In that vicinity salt-spray deposits killed the foliage of exposed pines, those that were open-grown or stood on the Bay edge of stands within 2 miles of the Chesapeake Bay or marsh. Only within ½ mile was there noticeable damage throughout the stands. The same storm wrought similar damage between Manteo and Cape Hatteras, North Carolina.[2]

Occasionally salt-spray damage may result from storms that bring large amounts of precipitation, such as the 1938 hurricane, when exposed trees as far as 45 miles inland were injured in Connecticut (*7*). However, in such storms high winds probably outlast heavy precipitation. For example, Hurricane Hazel caused extensive salt-spray damage to exposed loblolly pines between Myrtle Beach and Pawleys Island, South Carolina, even though it brought 8 inches of rainfall to that section. Most of the precipitation occurred before maximum wind velocities were reached.[3]

According to our observations, salt-spray deposits seldom kill forest trees on Maryland's Eastern Shore unless the trees are of poor vigor or are also weakened by insects or disease. Of course the foliage loss would reduce growth temporarily. Trew regards loblolly pine as more susceptible than pond pine (*Pinus serotina* Michx.), slash pine (*P. elliottii* Engelm.), and cluster pine (*P. pinaster* Ait.).[2]

[1]Mr. Little is with the Northeastern Forest Expt. Sta., Forest Service, U. S. Dept. Agric. Messrs. Mohr and Spicer are with the Maryland Department of Forests and Parks.

[2]Personal communication from I. Frederick Trew, West Virginia Pulp and Paper Company, Manteo, North Carolina.

[3]Personal communication from Lin B. Zulick, Jr., International Paper Company, Georgetown, South Carolina.

Flood Damage

Flooding with brackish water is far more damaging than salt spray on the Eastern Shore. Such flooding in 1933 killed the forest growth on appreciable areas, in some places on 100 to 200 acres in a single ownership.

During the summer of 1956, surveys were made—mostly by air and car—to determine the extent of recent damage from brackish-water flooding. These surveys indicated that by August 1 both pines and hardwoods had died in 1,000 acres of mixed stands, and that the pines in 5,000 acres of relatively pure stands had been killed or severely damaged. Most of this damage was caused by Hurricane Hazel. In North Carolina recent damage has been even greater: the killing of all tree growth on 20,000 acres in one holding was reported by Trew.[2]

There is some evidence that differences in the type of storm may affect the location of damage in the low-lying coastal forests. Damage resulting from the 1954 storm (Hurricane Hazel) seemed to be caused by extremely high storm tides that, unblocked by fresh water, overflowed into inland low places. Subsequent damage clearly attributable to that storm was found in spots where drainage channels had been plugged.

In contrast, Hurricanes Connie and Diane in August 1955 were accompanied by so much precipitation that inland low places were flooded with fresh water. Storm tides then were slightly lower than those in 1954, but high winds for several days kept brackish water pushed against forests that were exposed near the marsh. Hence most of the damage apparently caused by the 1955 storms was found in such exposed forests. It could not have been prevented by improved drainage.

Salt Deposits

Analysis of soil samples collected after the 1954 storm gave no conclusive evidence as to the concentration of salt that is lethal to tree growth. Salt contents of these samples were determined by Douglas Lenardson, a chemist for the Dorchester Fertilizer Company in Cambridge, and by the Agronomy Department of the University of Maryland. However, no trees were killed at the 12 sampled sites that had been flooded, even though in March they had 1,856 to 3,944 pounds of salt per acre in each of the top two 6-inch layers of soil.

In June 1955, dead and dying trees were noticed in previously unsampled areas, so samples were collected there in the 6 to 12-inch layer. This layer contained 5,034 to 6,566 pounds of salt per acre in two areas where trees were dead, 4,245 pounds in a spot where trees were dying. The total deposits in these areas may have been 9,000 pounds or more of salt per acre.

As would be expected, sampling in November 1954 and March and June 1955 showed progressive leaching. In some fields the top 6-inch layer lost 1,000 to 2,900 pounds of salt per acre between November and March; the second 6-inch layer gained 1,000 to 1,930 pounds. Between March and June the top foot of soils having unimpeded drainage lost 1,180 to 3,400 pounds of salt per acre in forested areas that had been flooded.

Two unflooded forest sites that were sampled in March 1955 had about 928 pounds of salt per acre in the top 6 inches. When sampled again in June, they had lost about 750 pounds of salt. Possibly these deposits came from salt spray that was washed into the soil.

Ecological Effects

From an ecologist's viewpoint, the most interesting results from brackish-water flooding are in the susceptibility of different tree species. Hardwoods, especially sweetgum (*Liquidambar styraciflua* L.), were much more susceptible than loblolly pine and were soon killed. In one area where Virginia pine (*P. virginiana* Mill.) grew, all trees of that species and of sweetgum were killed, though the associated loblolly pines as yet show no evidence of damage.

The greater susceptibility of the hardwoods and the recurrence of such damage may account for the usual lack of hardwoods under pine stands near the Bay. These factors may also explain why hardwoods are not usually a problem there in reproducing pine stands.

Many of the loblolly pines that border the marsh are slow-growing and appear deformed. We do not know whether their appearance is due to relatively high but nonlethal salt deposits in the soil, or to other causes. The effect of varying amounts of salt in the soil on the growth of loblolly pine should be investigated as a possible clue.

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Response of Planted Loblolly Pines to Reduction of Competition

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TREATMENTS THAT WILL reduce consumption of water by competing vegetation offer a major opportunity to increase survival of pine seedlings. Studies begun in 1953 on the Austin Experimental Forest, near Nacogdoches, Texas, measured the effects of such treatments on growth and survival after two and three years. Factors affecting first-year survival, including soil moisture, have been reported previously.[2]

Loblolly pine (*Pinus taeda* L.) seedlings were hand-planted, early and late in the 1953-54 and 1954-55 seasons, on plots that had received a variety of pre-planting treatments. Second-year mortality and total height were recorded for all plantings; for the 1953-54 plantings third-year mortality and height were recorded also.

[1]East Texas Research Center, maintained in cooperation with Stephen F. Austin State College, Nacogdoches, Texas.

[2]Ferguson, E. R. Causes of first-year mortality of planted loblolly pines in east Texas. Soc. Amer. Foresters Meeting 1956: 89-92, illus. 1957.

The plots were in two general areas of the Austin Experimental Forest, one wooded and the other an open field.

The woods plots were on very fine sandy loam soils of the Sawyer and Boswell series. The area supported an immature shortleaf-loblolly-hardwood sawlog stand with a sapling and pole-size understory of sweetgum (*Liquidambar styraciflua* L.) and oaks (*Quercus stellata* Wangenh. and *Q. falcata* Michx.). Sample tallies before treatment showed average stands of 237 pine stems per acre with a basal area of 44 square feet, plus 1,028 hardwood stems with a basal area of 63 square feet. Grass and weeds were almost completely absent and scrubby vegetation was sparse.

The soil of the open field was Cahaba fine sandy loam. The field had been improved for pasture in the late 1940's but had since been neglected and overgrazed. The predominant vegetation was Bermudagrass (*Cynodon dactylon* [L.] Pers.) and annual weeds.

TABLE 1.—CUMULATIVE PERCENTAGES OF SEEDLINGS SURVIVING SUCCESSIVE GROWING SEASONS ON VARIOUS COMBINATIONS OF COVER TYPE, SITE PREPARATION, AND YEAR OF PLANTING[1]

Manners and year of site preparation	1. Original planting, 1953-54			2. Replanting, 1954-55		3. Original planting, 1954-55	
	Survival through 1954	Survival through 1955	Survival through 1956	Survival through 1955	Survival through 1956	Survival through 1955	Survival through 1956
	Percent						
Wooded area							
A. Untreated check	18	16	13	86	64	....	....
B. Hardwoods controlled (1953)	75	74	72	89	80	....	....
C. Clearcut (1953)	19	18	18	88	76	....	....
D. Hardwoods controlled (1954)	....	....	....	....	....	82	79
E. Clearcut (1954)	....	....	....	....	....	46	42
F. Prescribed burn (1954)	....	....	....	....	....	82	49
Open field							
G. Untreated check	10	10	10	87	84	....	....
H. Scalped (1953)	24	24	23	....	....	....	....
I. Scalped (1954)	....	....	....	....	....	86	84

[1]Each value in the table (as A-1) represents the average of two replications or plots.

Experimental Procedures

On the wooded area in 1953-54, three treatments were compared: (A) untreated check; (B) hardwood control—cutting or girdling, and poisoning, of hardwoods 1 inch or more in diameter at ground line, shortly before pines were planted; and (C) clearcut—similar elimination of both hardwoods and pines shortly before pines were planted.

In 1954-55 these plots were replanted, providing tests on year-old prepared sites, and three sets of new woods plots were installed: (D) hardwood control—elimination shortly before planting, of hardwood only; (E) clearcut—elimination, shortly before planting, of both hardwoods and pines; and (F) prescribed burning—burned with a head fire shortly before planting.

On the abused Bermudagrass pasture, only two treatments were used in 1953-54: (G) untreated check was compared with (H) scalped—hoeing off all vegetation within 10 inches of each planting spot just before planting and again in May after each planting. This comparison was repeated in 1954-55, between (I) scalped—elimination of vegetation as in (H), but just before the new planting; and (G) untreated check.

In both cover types and in both years, each treatment (including the check) was applied on two randomly located plots of ½-acre or less. Seedlings were planted on each plot, 100 in December and 100 in February. On both the wooded area and the open field, the untreated checks of 1953-54 were utilized as checks in 1954-55 also, by replanting them with additional seedlings. On the wooded area, the hardwood control and clearcut plots of 1953-54 were replanted with additional seedlings in 1954-55, to test the effects of modifica-

tions applied one year before planting.

Freshly lifted seedlings from the Texas Forest Service's Indian Mound Nursery at Alto were planted on December 21, 1953 and February 18, 1954. The freshly lifted seedlings planted late in December 1954 and in mid-February 1955 were obtained from the U. S. Forest Service's Stuart Nursery at Pollock, Louisiana.

The details of original planting and replanting of the variously treated pairs of plots, with their cumulative survival percentages, are summarized in Table 1. As randomization of treatments over plots could not, under existing circumstances, be extended beyond any one year's planting on one cover type, and as seasonal differences in weather were confounded with nursery source of seedlings, direct comparisons of results are restricted. Rigorous comparison of two modifications and an untreated check planted on the wooded area in 1953-54 is possible, as is rigorous comparison of five modifications and the untreated check planted on the wooded area in 1954-55. There is a strong parallelism between the 1953-54 and 1954-55 tests on the open area and between the 1953-54 tests and three of the six 1954-55 treatments on the wooded area, but the design precludes rigorous analysis of these 2-year results.

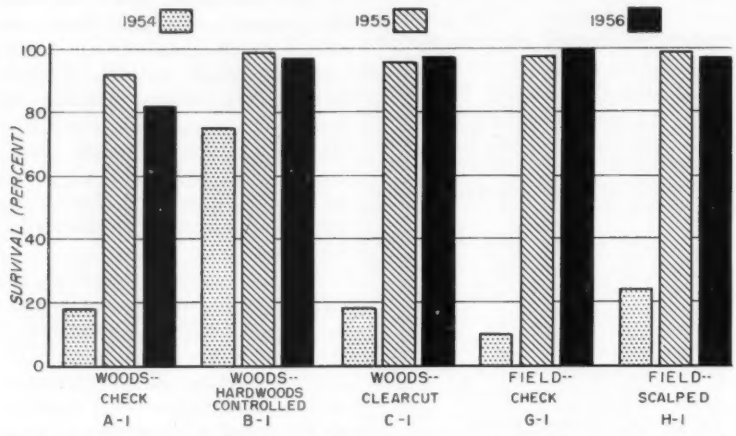

FIG. 1.—Proportion of seedlings surviving successive growing seasons on sites treated in 1953 and planted in 1953-54. Percentages are based on the number alive at the beginning of each season.

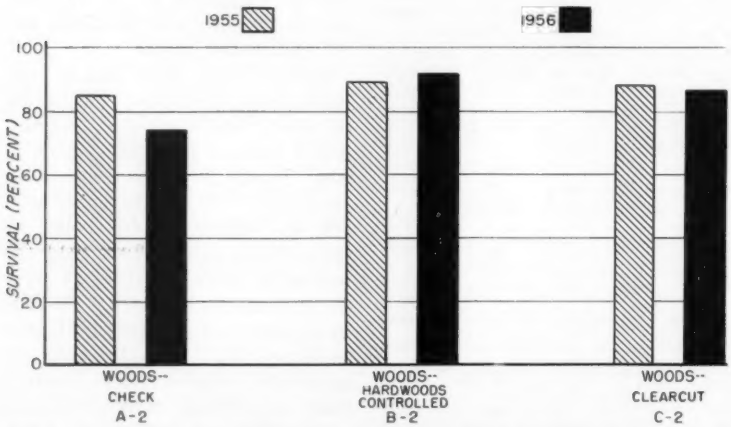

FIG. 2.—Proportion of seedlings surviving successive growing seasons on sites treated in 1953 and planted in 1954-55. Percentages are based on the number alive at the beginning of each season.

Results

The summer of 1954 was hot and dry: there were two periods of over 30 days without appreciable rainfall and with temperatures ranging well above 100° F. During 1955, showers were fairly frequent, maximum temperatures usually did not get beyond the 90's, and the only prolonged drouth occurred in September. During 1956 the weather was again hot and dry; from March through September precipitation was normal or better in only two months and the total deficit for the period exceeded 7 inches.

Periodic soil-moisture measurements during 1954 showed that removal of competition definitely affected the soil-moisture regime. Untreated plots were subjected to severe soil-moisture stresses during most of the summer, while plots where competition was completely eradicated retained water above the wilting point throughout the growing season. During the latter two years of the study, information on soil moisture was available from related studies in the same area. During 1955, soil moisture was not a critical factor under any condition, while in 1956 the pattern was quite similar to that in 1954.

Survival. — First-year survival was low on all the 1953-54 plantings except where the hardwoods were controlled (B-1) (Fig.1). Pales weevil accounted for over two-thirds of the mortality on the clearcut plots (C-1). On the other three treatments drouth was considered responsible. Once the heavy losses of the first year were over, survival was uniformly good on all but the woods checks (A-1), where many seedlings died each succeeding year.

When sites prepared in 1953 were replanted in 1954-55, first-year survival was higher than the previous year, and there was little difference between treatments (Fig. 2). During the second year, survival on the untreated woods checks (A-2) fell off considerably while the other two treatments maintained almost as good survival as in the first year.

On newly prepared sites, all 1954-55 plantings except those on clearcut plots (E-3) showed fairly high first-year survival (Fig. 3). (The heavy mortality on the clearcut plots was caused by pales weevil.) Survival through the second year was good except on the untreated check (A-2) and the prescribed-burned (F-3) plots.

Height.—In the open field, no significant difference in height had developed either in the 1953-54 or in the 1954-55 plantings by the end of 1956.

In the woods, by the end of 1956, there were highly significant differences in heights of the trees representing the three original treatments (Fig. 4). On the clearcut plots (C-1), trees were over 6 feet tall. Those on hardwood-control plots (B-1) averaged better than 4 feet, while those on the untreated checks (A-1) averaged only slightly over one foot.

After two years, the 1954-55 plantings on sites treated in 1953 showed no significant height differences between trees on the hardwood-control (B-2) and the clearcut plots (C-2). The trees on the untreated woods checks (A-2) averaged 1.45 feet, significantly shorter than the 2.9-foot average of the other two treatments.

After two years' growth, trees planted in 1954-55 on freshly prepared sites showed height differences related to treatment. Those on the clearcut plots (E-3) were highly significantly taller than those on any other treatment. Trees on the hardwood-control plots (D-3) were highly significantly taller than those on either the burned plots (F-3) or the untreated woods checks (A-2); these latter did not differ significantly in height.

Trees planted on sites prepared a year in advance were considerably shorter after two years than comparable seedlings on plots treated immediately before planting. In the hardwood-control treatments, the trees were 0.32-foot taller where they were planted on freshly prepared sites, while on the clearcut plots they averaged 1.0-foot taller.

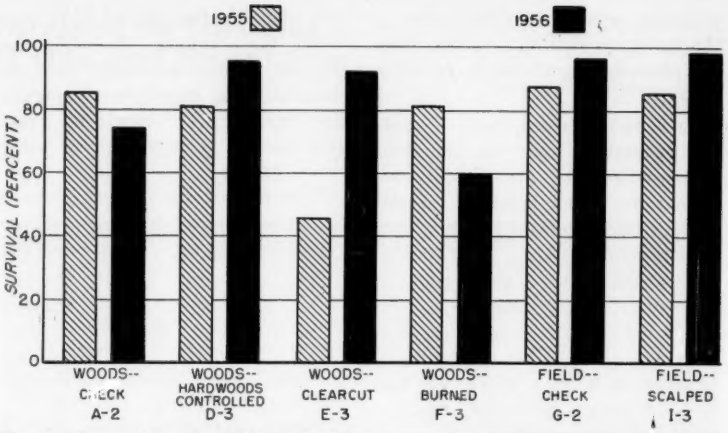

FIG. 3.—Proportion of seedlings surviving successive seasons on sites treated in 1954 and planted in 1954-55. Percentages are based on the number alive at the beginning of each season.

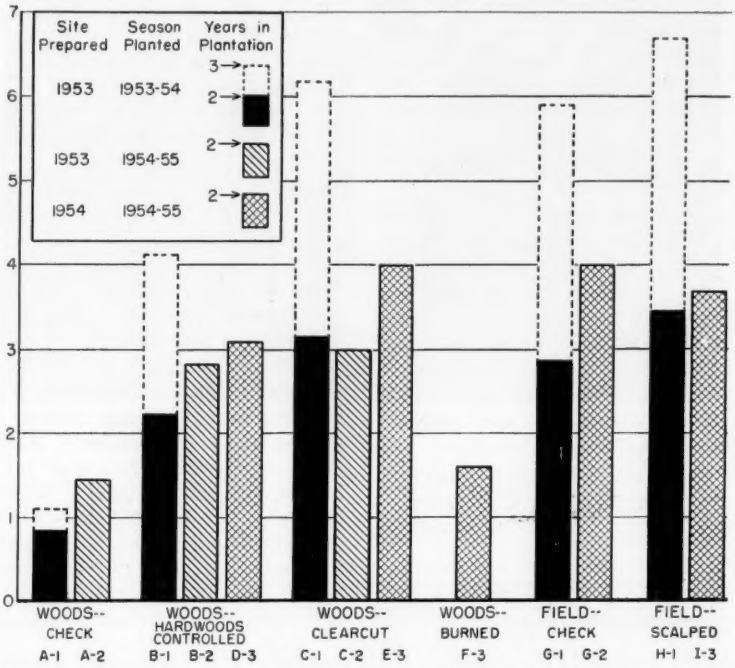

FIG. 4.—Average heights after two growing seasons (all plantings) and after three (1953-54 plantings only).

Trees planted in December averaged taller than those planted in February. On the woods plots treated in 1953 these differences, though fairly consistent, were not statistically significant for either the first or second year's planting. On sites treated in 1954 differences were highly significant after two growing seasons.

In the field, the three-year-old trees that had been planted in December averaged 0.8 foot taller than those planted in February, and the two-year-old December-planted trees averaged 0.3 foot taller. These differences were significant at the 5 percent level for both sets of data.

Discussion

Most of the variations in both survival and height growth are

probably related to differences in the moisture available on the various plots during the three growing seasons.

Prior to treatment, roots of existing vegetation, on both the field and woods plots, undoubtedly occupied the upper layer of the soil sufficiently to utilize the available moisture fully. In the woods, burning is believed to have reduced this root system slightly, while hardwood control reduced it considerably and clearcutting almost completely. In the field, scalping reduced root competition moderately and temporarily.

During the dry growing season of 1954, seedling survival reflected[3] the varying increases in available soil moisture resulting from these treatments. In 1955, when rainfall was well distributed, moisture was apparently sufficient for both seedlings and established vegetation, so no significant survival differences developed.

By the second dry summer (1956) most seedlings had evidently tapped more dependable moisture supplies, and survival was generally high except for the untreated woods, where both the 1953-54 and 1954-55 plantings suffered more mortality than in 1955. Here competition for moisture (and perhaps for sunlight) was acute. While most seedlings that had become successfully established on the clearcut and hardwood-control plots by the end of 1955 survived the summer of 1956, the slightly higher mortality rate on clearcut plots may reflect competition from heavy stands of grass and weeds that came in after clearcutting.

Growth of seedlings showed similar relations to reduction in competition. Among all the wooded areas, trees made best growth on the clearcut plots, were slightly shorter where hardwoods had been controlled, and shortest in untreated stands. Heights for both treatments were significantly above those on untreated plots. Growth in the field was similar to that in the clearcut woods, though the comparison is of limited value since the soils were dissimilar. Scalping improved growth of seedlings planted in 1953-54 but not those planted a year later.

The transitory effect of release is revealed by height differences in 1954-55 plantings. The average heights attained on freshly treated sites were 0.3 to 1.0 foot greater than on sites prepared a year previously. These differences are believed to reflect renewed competition from grasses and weeds that had invaded the plots by the second growing season.

The superiority of the December planting over February planting showed consistently over a wide range of site treatments and during two planting seasons. While little growth takes place above the ground between December and February, it appears that seedlings benefit from this additional cool, moist period in their new locations.

[3]Except in clearcutting, where heavy damage from the pales weevil reduced otherwise high survival.

Summary

The development of planted loblolly pine seedlings was studied during three growing seasons in east Texas. The seedlings were on plots where competing hardwoods or grasses had been controlled in various ways.

1. During dry seasons, first-year survival improved with increased intensity of release but during a year of well-distributed rainfall it was not much affected by release.

2. Survival after the first year was generally high, but losses in untreated and burned woods during 1956 reflected critical competition in a dry season.

3. Release from competition increased height growth for two or three years after planting—the increase was roughly proportional to the degree of release.

4. Seedlings on freshly prepared sites made better height growth than those on sites prepared a year before planting was done. The difference is believed to reflect renewed competition from invading vegetation that became rank on the treated areas during the second year.

5. Release benefited seedlings chiefly by lessening the competition for soil moisture; the effects were especially noticeable during droughts.

6. Under identical site conditions, trees planted in December grew taller than those planted in February.

Effect of Season of Treatment on Girdling and Chemical Control of Oak and Sweetgum

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WITHIN THE LAST DECADE, information dealing with control of undesirable trees has become voluminous. However, one of the least understood factors associated with various methods of control is season of treatment and how it can be most advantageously used in forest management.

Grano (*2*) found that the most rapid and complete kill of southern red and post oaks in southern Arkansas was obtained by girdling in the spring, particularly in May. Girdling during this period of the growing season also materially reduced the number of live sprouts, but had no effect upon the size of the sprout clump. Arend (*1*) found that chemical-in-frill treatments in the summer and fall (July through October) gave best results in lower Michigan. Similar information is lacking over a wide range of species in the South.

The purpose of the study described here was to determine the effectiveness of 2, 4, 5-T applications in frills and of simple frill-girdles made at different seasons of the year. Because these treatments require a considerable period of time to be fully effective, short-term observations may be misleading. In this study observations were continued until it was evident that no more trees would die from the treatments. The results have been combined in a table that can be used to make reasonably accurate estimates of the time needed for a desired level of release under Coastal Plain conditions. Similar tables can be developed for any locality and species by determining the seasonal effect of the treatments on both the amount and speed of mortality.

Experimental Setup

The investigation was conducted on the Santee Experimental Forest near Charleston, South Carolina. Beginning in February 1953, groups of 20 trees each of three major hardwood associates of loblolly pine were treated every month for 12 months. These associates were willow oak (*Quercus phellos* L.), post oak (*Quercus stellata* Wangenh.), and sweetgum (*Liquidambar styraciflua* L.). One-half of the trees were frill-girdled by means of overlapping ax cuts made at a convenient chopping height, and the remaining half were frill-girdled and a water mixture of 2, 4, 5-T (4 pounds acid equivalent in 50 gallons of mixture) applied (Fig. 1). No treatments were made after January 1954.

FIG. 1.—Method of applying 2, 4, 5-T in a single frill-girdle.

The trees were selected at random from several loblolly pine-hardwood stands. All selected trees were within a diameter range of

TABLE 1.—THE AVERAGE DIAMETER AND THE DISTRIBUTION ACCORDING TO CROWN CLASS OF OAK AND SWEETGUM TREES SELECTED FOR CHEMICAL TREATMENT OR GIRDLING

Crown class	Distribution of stems		Average d.b.h.	
	Oaks	Sweetgum	Oaks	Sweetgum
	Percent		*Inches*	
Dominant	2	2	12.3	12.8
Codominant	8	7	10.1	11.6
Intermediate	80	82	9.3	9.7
Suppressed	10	9	7.9	8.0

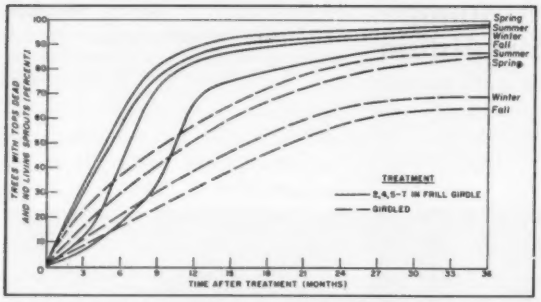

FIG. 2.—Cumulative percentage of willow oak and post oak trees dead, in relation to months after girdling or treatment with 2, 4, 5-T in frills in different seasons.

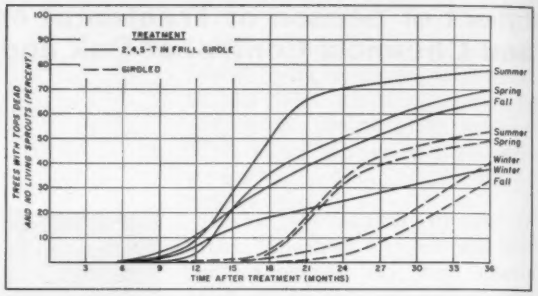

FIG. 3.—Cumulative percentage of sweetgum trees dead, in relation to months after girdling or treatment with 2, 4, 5-T in frills in different seasons.

TABLE 2.—RELATION OF SPROUTING TO TIME AFTER TREATMENT

Treatment and time after treatment	Growing season		Dormant season	
	Oaks	Sweetgum	Oaks	Sweetgum
	Percent of trees with sprouts			
Girdled				
24 months	14	49	33	62
36 months	10	19	17	20
2, 4, 5-T in frills				
24 months	7	26	7	48
36 months	5	9	4	11

6 to 13 inches d.b.h., as previous investigations have shown that the chemical-in-frill treatment of trees less than about 6 inches d.b.h. is not practical or economical. Furthermore, stems above 13 inches d.b.h. usually do not sprout profusely. Only trees that appeared to be of seedling origin were selected. The majority of trees were in the intermediate crown class, as is often the case before cutting in pine-hardwood stands of this locality (Table 1).

Each treated tree was examined at 3-month intervals for the first 12 months after treatment. Subsequent observations were made at 6-month intervals and were terminated at the beginning of the third growing season after the last treatment (April 1957).

During the growing season treated trees were rated as follows: (1) dead crown, no sprouts, (2) dead crown, living sprouts, and (3) living crown. For living crowns the percent of crown dead was recorded. In the dormant season, mortality was judged by the presence or absence of live cambial tissue.

To facilitate analysis of the data, the treatments were grouped by season as follows: spring (March, April, May); summer (June, July, August); fall (September, October, November); and winter (December, January, February). Phenologically, these groups of months in the Charleston area correspond to early growing season, late growing season, early dormant season, and late dormant season, respectively.

Results

Mortality.—Observations over a period of two or more years showed some difference between species in response to treatment and season of application (Figs. 2 and 3). Sweetgum was the most difficult to kill, while willow oak was easiest. In general, 2, 4, 5-T in frills resulted in faster and more complete kill (dead crown, no sprouts) than girdling, and growing season treatments resulted in faster kill than dormant season treatments.

There were some exceptions to these general effects. Girdling in spring or summer killed more sweetgum trees than 2, 4, 5-T applied in winter and killed almost as many oak trees as 2, 4, 5-T applied in summer, but the oaks died sooner after the chemical treatment (Fig. 3).

This test also showed that the amount and the rate of complete kill are not necessarily related. Trees continue to die for as long as two years after girdling or chemical application; consequently, at least that length of time must pass before the effect of treatment can be accurately evaluated.

Sprouting.—Approximately 30 percent of all trees had produced living sprouts two years after treatment. The major portion of this sprouting occurred on sweetgum. By the end of the third year, however, only 12 percent of all treated trees bore living sprouts (Table 2).

Close observation of the phenological development of sprouts in this test indicated that most of the remaining sprouts would die within the next two or three years. Examination of trees which sprouted after the first growing season showed a general discoloration of foliage and decline in vigor during the third season after treatment. Even where most aggressive, sprouts probably would not hinder advanced reproduction to any great extent (Fig. 4). Most of the sprouts were less than 3 feet in height and arose from the basal portion of the treated stems.

Growing-season treatments were more effective than dormant-season treatments in suppressing early sprouting, but after 36 months

FIG. 4.—The maximum degree of sprouting on an 8-inch sweetgum girdled in the dormant season. This was after three years. The test indicates that most of such sprouts die within three years after girdling.

there was not much difference attributable to the season of treatment (Table 2). Although chemically treated trees produced less than one-half as many sprouts as girdled trees, this final difference (at 36 months) was at such a modest level that it is not very important silviculturally.

The results of girdling solely, as compared with the results of girdling and treating with 2, 4, 5-T in water, have been summarized in terms of average number of months from the time of treatment till the attainment of 50 percent and 70 percent mortality (Table 3). In addition, values found in an earlier test (*3*) are given for frilled sweetgum treated with 2, 4, 5-T in oil. Although the results of a particular control operation will vary with weather, thoroughness of treatment, size of trees, and other factors, the table may help land managers to select a time and treatment for accomplishing a given degree of release in the South Atlantic Coastal Plain area.

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2. GRANO, CHARLES X. 1955. Behavior of south Arkansas oaks girdled in different seasons. Jour. Forestry 53: 886-888, illus.
3. SHIPMAN, R. D. 1955. Better sweetgum control with 2,4,5-T. U. S. Forest Serv. Southeast. Forest Expt. Sta. Research Note 84, illus. (Processed.)

TABLE 3.—MONTHS BPTWEEN TREATMENT AND ATTAINMENT OF 50 PERCENT AND 70 PERCENT MORTALITY IN WILLOW OAK, POST OAK, AND SWEETGUM

Season of treatment	50 percent or greater mortality[1]						70 percent or greater mortality					
	Girdle			2,4,5-T in water[2]		2,4,5-T in oil[2]	Girdle			2,4,5 T in water[2]		2,4,5-T in oil[2]
	Willow oak	Post oak	Gum	Oaks[3]	Gum	Gum	Willow oak	Post oak	Gum	Oaks[3]	Gum	Gum
	Months											
Early growing season (March, April, May)	9	17	36	5	23	6	14	33	36	7	34	8
Late growing season (June, July, August)	11	8	36	5	18	7	16	21	36	8	23	9
Early dormant season (Sept., Oct., Nov.)	17	23	36	10	26	12	27	36	36	13	36	18
Late dormant season (Dec., Jan., Feb.)	15	19	36	7	36	24	22	36	36	9	36	36
All seasons	13	17	36	7	26	12	20	32	36	9	33	14

[1]Mortality means top killed and no living sprouts.
[2]4 lbs. acid equivalent of 2,4,5-T in a 50-gallon mixture applied in frills.
[3]Willow and post oaks.

Notes

Moisture Held in Pine Litter

Considerable research time has been spent on studies of interception of rainfall by forest canopies. Conversely, the sponge effect of the forest floor, although well recognized, has received limited study.

In order to determine the moisture content of litter in pine stands in the Southeast, data were collected in a 12-year-old loblolly plantation on an old-field site. The forest floor of this stand consisted of a 2-inch layer of undecomposed needles and weighed about 4.3 tons per acre ovendried. Although the lower needles were beginning to decompose, no black amorphous humus layer was present.

One-square-foot samples of all the forest floor down to mineral soil were cut out and placed in a wire frame. The frame and litter were replaced in the hole. The quantity of needles was kept constant by placing a sewing-thread screen over the frame. Any needlefall was easily detected and removed from the frame. Samples were weighed daily, and at the end of the experiment the material was ovendried. Then the moisture content was determined for each day.

The experiment was conducted over a 65-day period in the late summer and early autumn. Fifteen rainstorms occurred during this period ranging in size from 0.04 to 2.58 inches.

Figure 1 shows that the litter held a minimum of 0.01 inch and a maximum of 0.09 inch of water during the study period. The litter reached maximum moisture content only after prolonged rains. For example, if a storm of 0.7 inch fell on dry litter, the moisture content rose to about one-half of the maximum. If this same rain was preceded by a rain of 0.2 inch the day before, then the moisture content reached its maximum value.

The graph illustrates the period of time without rain required for the litter to dry to a constant weight. Saturated litter loses approximately 77 percent of its water during the first four days of drying. On about the fourth day, moisture loss begins to taper off. Equilibrium is reached on the eleventh day, and no moisture loss occurs thereafter.

The amount of water held by pine needles is small—at most but 0.09 inch. However, from a water control standpoint, this can be important on an area basis. Litter does function effectively in reducing raindrop impact and subsequent erosion, in slowing overland flow and allowing more time for infiltration of water, in maintaining surface soil in condition for rapid infiltration of water, and in reducing erosion by holding the soil in place.

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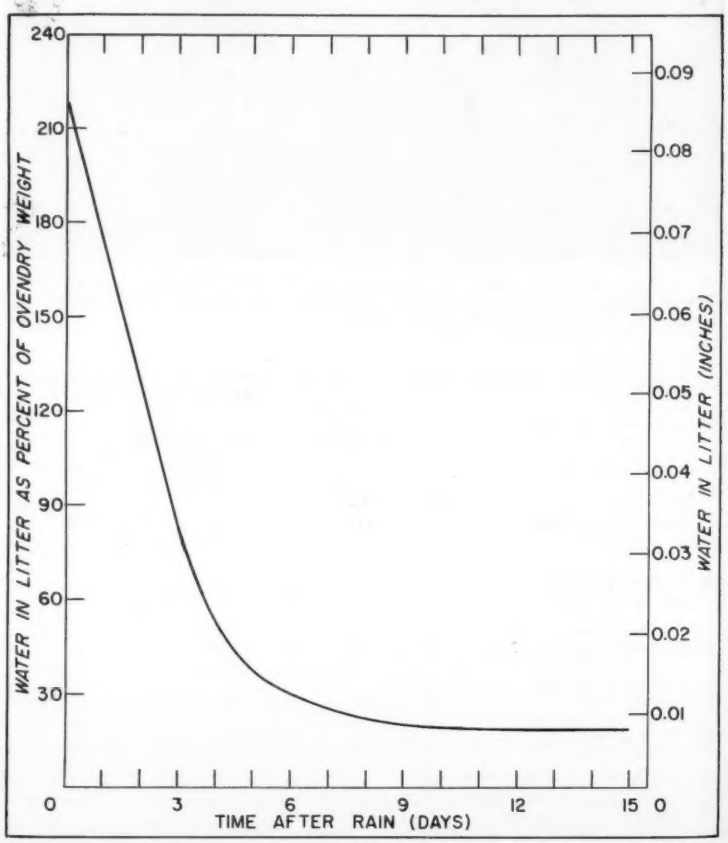

FIG. 1.—Drying of litter in a loblolly pine plantation.

Two-Year Results of Planting Yellow-Poplar in North Alabama

Two-year-old plantings in north Alabama indicate that soil moisture as affected by topographic position and aspect may have an important bearing on growth and survival of yellow-poplar (*Liriodendron tulipifera* L.).

A study was installed early in 1955 on the Flat Top Experimental Forest near Birmingham, Alabama. About 1,400 seedlings were planted on the north and south aspects and in the bottoms of four upland draws. The sides of the draws are moderately steep and about 90 feet from ridgetop to bottom. On the slopes, the soil is an immature, azonal Muskingum silt loam derived from underlying siltstone or sandstone, with interbedded shales. Soil in the bottoms of the draws is a silt loam alluvium from the slopes.

A strip 70 feet wide running across each of the draws from ridgetop to ridgetop was cleared of trees and shrubs just prior to planting. Trees over 7 inches d.b.h. were harvested and the smaller trees and shrubs were either deadened or cut and piled. In late February 1955, yellow-poplar was hand-planted at a spacing of 5 by 6 feet. A circular area one foot in radius was cleared of weeds around each tree in July of the same year, but no subsequent cultural treatments were applied.

On June 19, August 8, and September 17, 1956, total moisture in the surface 10 inches of soil was determined by gravimetric procedures. Tree survival and total height were measured in October 1956. These data were obtained for the bottoms and the lower, middle, and upper slopes of both the north and south aspects.

Results

Two years after planting, the vigorous trees in the bottoms and lower slopes are in marked contrast to the unthrifty specimens on the middle and upper south aspects. The variation in heights among the seven topographic positions (shown in Table 1) is significant, though the variation in survival is not.

TABLE 1.—AVERAGE SECOND-YEAR SURVIVAL AND TOTAL HEIGHT OF FOUR STRIPS OF PLANTED YELLOW-POPLAR WITH RELATION TO SOIL MOISTURE AND TOPOGRAPHIC POSITION

Topographic position	Soil moisture[1]	Height	Survival
	Percent	*Feet*	*Percent*
Bottom	25	5.0	85
North aspect:			
Lower	23	4.1	92
Middle	21	4.0	85
Upper	19	3.2	88
South aspect:			
Lower	20	3.7	84
Middle	17	2.8	71
Upper	14	1.7	61

[1]Average of soil moisture percents ascertained on June 19, August 8, and September 17, 1956.

Height growth was best in the bottoms. There the trees averaged 5 feet high in two years, with some individuals exceeding 9 feet. The trees also grew well on the lower slopes of both aspects and on the middle slope of the north aspect.

Each of the three series of soil samples showed total moisture content to be highest in the bottoms and lowest on the upper slopes. South aspects were drier than north aspects. As the highly significant regression in Figure 1 shows, average seedling height on each of the 28 plots was closely correlated with average soil moisture ($r = 0.823^{**}$ with 26 dfs). Both average height and soil moisture were lowest on the upper slopes of the south aspect. Survival after two years was good on all sites, although north aspects and positions below the upper slope tended to be

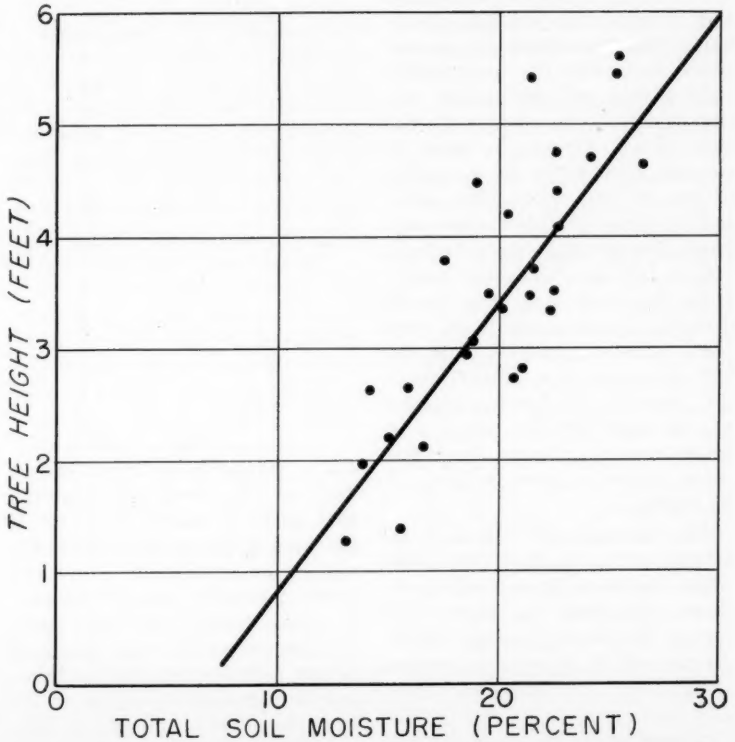

FIG. 1.—Regression of yellow-poplar height on soil moisture (average tree height and soil moisture from 28 plots representing seven topographic positions).

best. The appearance of the surviving yellow-poplar on the drier sites indicates that additional mortality may be expected.

These findings are in agreement with results of other investigators working in the South. In Tennessee, Minckler[1] found that north aspects of old fields had more moisture in the soil and better yellow-poplar growth than south aspects. Lower slopes and bottoms seemed to be the better sites for this species. Both Freese[2] in north Alabama and Williston and Huckenpahler[3] in north Mississippi reported significantly better growth on lower slopes and bottoms than on upper slopes. The latter also found better survival at the lower elevations.

Preliminary indications therefore are that yellow-poplar planting in north Alabama should be confined to the bottoms, lower two-thirds of the north aspects, and the lower one-third of the south aspects of upland draws. On moister but well drained areas, planting may be safely done at higher levels on the slope. On drier sites, planting should be restricted to the bottoms and lower slopes of the north aspects, while south aspects should be avoided entirely.

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[1]Minckler, Leon S. Old field reforestation in the Great Appalachian Valley as related to some ecological factors. Ecol. Monog. 16:87-108, illus. 1946.

[2]Freese, Frank. Yellow-poplar underplanting. U. S. Forest Service Southern Forest Expt. Sta. South. Forestry Notes 77. 1952.

[3]Williston, H. L., and B. J. Huckenpahler. Hardwood underplanting in north Mississippi. Jour. Forestry 55:287-290. 1957.

Carolina Poplar Plantation Yields 55 Cords Per Acre at 25 Years

In the spring of 1930, 1,000 rooted cuttings of Carolina poplar were set out on the C. S. Brown Estate (now Cornell University Biological Field Station), on the south shore of Oneida Lake near Shackelton Point, New York. The area planted is a low flat adjoining a lake level drainage channel which maintains the water table right at the soil surface for approximately three months of the year. Each spring the area is covered with water for a period of two to three weeks. The elevation is about 380 feet above sea level. The growing season is from 150 to 165 days.[1] The soil ranges from the lower side of a poorly drained Canandaigua to a very poorly drained Colwood. Both are silt loams developed from stratified, high lime, lacustrine deposits of silt, and very fine sand, with lesser amounts of clay. Very few roots penetrate below a depth of 15 inches.

The cuttings were spaced 6 by 6 feet on an area of 0.88 acres which had been plowed and fitted. Some cultivation was carried out during the initial growing season. At the end of 25 growing seasons there were 299 surviving trees with a computed basal area of 199.5 square feet per acre and an average d.b.h. of 10.4 inches. Average total height of dominants and codominants was 80 feet, with an average merchantable length of 52 feet to a 4-inch d.i.b. top. The diameter distribution for the total stand is given in the following table:

D.b.h. class (inches)	No. of trees
6	4
7	38
8	46
9	53
10	55
11	39
12	25
13	13
14	7
15	9
16	4
17	1
18	4
24	1
Total	299

The plantation received no cultural or other treatment after the first growing season. Actually it has been seriously overstocked for at least 10 years, with consequent heavy mortality during the past 5 years. Except for the larger dominant trees, 11-inch d.b.h. and larger, crowns were short and narrow and frequently dying at the top. Natural pruning has been good. Tree form is excellent, with straight, single stems. Girard form class for dominants and codominants is .78. No serious insect or disease injuries are evident.

The stand was marked for thinning at the time of the inventory to aid the development of the better-formed trees and to continue the plantation for study and demonstration. Thinning data are as follows:

	Before thinning	After thinning
No. of trees (total stand)	299	198
Basal area per acre	199.5	143.6
Average d.b.h.	10.4	10.7

The thinning removed 28 percent of the basal area. Four cords of this were taken to the State University College of Forestry at Syracuse, New York for pulping tests and these are showing very promising preliminary results. The total yield of peeled wood to a 4 inches d.i.b. top, based on direct measurements of 40 felled trees, is 4,657 cubic feet per acre. Using a conversion factor of 85 cubic feet per cord, this is equivalent to 55 cords of peeled wood per acre, an average net annual increment of over 2 cords per acre for 25 growing seasons. Even though it is not known which clone this "Carolina" poplar represents (possibly *Populus eugenei* or *P. robusta*), the ancestry need not cause undue concern. If it is felt that this performance is outstanding under the existing conditions, cuttings can be made from these trees.

Similar fertile but poorly

[1]Mordoff, R. A. The climate of New York State. Cornell Extension Bulletin 764. 1949.

drained soils with year round high water table have presented a planting problem to foresters. It may be that this hybrid or a related one can bring such sites into forest production.

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Water and Forests in Britain

Anybody who has been in Britain in the winter and has experienced the chill of the damp fog and rain, and the almost universal mud under foot outside of the towns, will be surprised that shortage of water can be an acute problem. Yet it is, and a very serious one. Precipitation, except in the West, is not heavy, only a little over 30 inches in the middle of the country and considerably less in the East. It is fairly evenly distributed throughout the year. The weather, unlike that in most of America, comes in long stretches. A wet period with cloud and occasional rain, usually not heavy, will last for weeks; then, in summer, there may be sunshine day after day and week after week. If the winter rains have been deficient (February is locally known as "fill dyke") a drought in summer is almost certain. This occurs frequently, with greater or less severity, and hits not only the farmers but the townspeople, who comprise a large majority of the population. For example, Taunton, the county seat of Somerset in southwest England, doubled in size after the war. After shortages which required cutting off the water supply part of each day almost every summer, the town was finally obliged to incur the heavy expense of going further afield to develop additional water supplies. Instances of this kind, which directly affect the pocketbook nerve, combined with a growing realization that suitable reservoir sites are not unlimited while population grows apace, are making the people of Britain water minded.

The following from the special article in the *London Times* for July 19, 1957, by their science correspondent, headed "Effect of Afforestation on Water Supplies" with the sub-head "Research Indications that Trees Reduce Reserves" shows the increasing degree of water mindedness in Britain.

> . . . "the indications are that afforestation, so far from increasing water supplies, reduces them. This is not surprising when it is remembered that trees, by virtue of their root systems, are able to take up considerable quantities of soil moisture, which is either assimilated into plant tissues or is transpired from the leaves. It is, however, in disagreement with many general statements made in the past. The main basis of these statements was the idea that trees, by reducing immediate run-off, increased the reserves of water which were retained locally."

The science correspondent says that the evidence has been discussed by Dr. J. D. Ovington of the Nature Conservancy at Merlewood Research Station, a distinguished member of the British Ecological Society, in a recent issue of *The Times Science Review*. He goes on:

> . . . "the interception of rainfall—and even more of snow—by a forest canopy is an undoubted effect. Water which would otherwise penetrate to ground level simply does not get there. This seems to be most marked with conifers, whose needle-like leaves have many cavities for the trapping of water.
>
> "To determine the water-balance of a tree cover, and to compare this with that of other forms of vegetation is clearly a difficult undertaking. One type of experiment, necessarily lengthy, makes use of large open tanks, known as lysimeters, big enough for trees to be grown in, and provided with basal drains and a collecting chamber. Such an experiment was begun in Holland during the war, using dune sand as the soil. It is at the stage now of preliminary results. The comparison is between covers of pine, mixed hardwoods, natural dune plants, and bare sand. The results may not be typical of other conditions, but confirm in a general way the production of a marked reduction in run-off by a grown pine plantation.
>
> "Experiments of another kind have been done in the Appalachian Mountains of the eastern United States. The approach, in this case, has been to make use of natural small drainage basins, separated by steep ridges. The drainage basin as a whole is then the unit. The run-off at the outlet of each basin used can be measured; but for comparisons between one set of conditions and another, it is necessary to use the same basin and wait. The removal of natural woodland, followed by the cutting back of new woody growth annually, has been reported in one case to have increased run-off by nearly two-thirds.
>
> "Other experiments have been done by F. Law on the east side of the Yorkshire Pennines. Here the comparison is between a dense stand of spruce, about 30 ft. high, and a grass-covered percolation gauge, and also with the catchment area as a whole. Here the tree roots—shallow in this species—are underlain by impermeable clay. The building of a surrounding wall of concrete has thus sufficed to enable drainage water to be collected. Here, too, the conclusion is qualitatively the same. The proportion of water intercepted and evaporated from the tree canopy was 38 percent of the rainfall during a four-day test in summer; the run-off was less during the same period by more than 11 inches than that recorded either from the grass-covered gauge or from the catchment area—mainly rough hill grassland and moorland. 'If the results obtained

. . . are correct, the reliable daily yield of about three million gallons of water from every 1,500 acres of the catchment will be reduced by about a third once the area is converted into a spruce forest.'

"The question of water supplies cannot be considered in isolation. Land, so far as possible, needs to be otherwise used. The value to Britain of timber reserves has been generally accepted; and, on infertile uplands, afforestation offers an alternative use to hill grazing which, superficially at least, is attractive. But as Professor W. G. V. Balchin has lately pointed out, demands for water from both industry and agriculture have been increasing faster than expected, and the problems of water supply undertakings are becoming more difficult. It may be necessary therefore, to consider afforestation, not only in relation to hill farming, but in relation to the value of the watershed in question in accessibility to districts needing water.

"What is surprising in the situation is that attempts to arrive at quantitative data should be comparatively recent, and that the range of conditions covered is still small. As Dr. Ovington wrote: 'An accurate knowledge of the relative effects of different forms of land management upon the supply of water from the upland regions of Britain would be advantageous at the present time, when land use is being changed over large areas. This knowledge can be attained only from carefully planned field experiments established over a wide range of typical sites.' Compared with the capital cost of both afforestation projects and water supplies, the scale of expenditure on research would not be large. But there would be need also for experiments to be done using different methods of measurement, and covering longer periods of time."

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Air-Layering of Norway Spruce and Blue Spruce

During the growing seasons of 1955 and 1956, attempts were made to propagate Norway spruce (*Picea abies* L. Karst) and blue spruce (*Picea pungens* Engelm.) trees vegetatively by the air-layering method. Numerous reports of the successful vegetative propagation of Norway spruce have appeared in the forestry literature since the first successful experiments were reported by Deuber and Farrar.[1] All of these reports described experiments which dealt with the rooting of cuttings either in the greenhouse or in outdoor frames or with the multiplication by grafting. Because good results have been obtained by air-layering several species in the genus Pinus, experiments were designed to test the applicability of this method to the vegetative propagation of Norway and blue spruce.

The Norway spruce trees used were seven years old and were growing in a plantation on the grounds of the Yale Forestry Research Center in Valhalla, New York. The blue spruce trees were growing in a plantation on the Broad Acres Farm in Shelton, Connecticut. The average age of the blue spruce trees was about 10 years.

The following variables were tested in these experiments:

1. *Time of year.* The air-layers were applied during three different periods: April, June, and August.

2. *Effect of indolebutyric acid.* Four concentrations of indolebutyric acid in talcum powder were tested: 0 percent; 0.5 percent; 1.0 percent; and 1.5 percent.

3. *Type of wounding*: Four types of wounds were used: (*a*) a girdle about ½ inch wide was cut and the bark was removed down to the xylem; (*b*) same as (*a*) except that the girdle was 1/10 inch wide; (*c*) the bark was scraped off on one side of the branch down to the xylem for a distance of about ½ inch; (*d*) a 10-gauge steel wire brad was inserted under the bark in a horizontal position on the upper side and at right angles to the main axis of the branch.

The air-layers were applied on the side branches in the upper whorl of the tree. Those applied in April were located on the previous year's growth; those made in June were placed at the transition between the previous year's and the current year's growth, and those in August were made on the current year's growth. When a girdle was used, the exposed wood was scraped with the back of a knife blade to remove any remaining cambium cells. Moist sphagnum moss was used throughout the experiments as a rooting medium, and polyvinyl sheets (7 inches x 9 inches) were wrapped around the moss. The air-layers were held in place with "Twistems." The indolebutyric acid in talcum powder was applied by dipping a few moistened strands of sphagnum moss into the preparation, and wrapping these directly around the wound.

The following are the preliminary results which were based on a total of 640 air-layers:

1. Both Norway spruce and blue spruce responded to the air-layering method.

2. Norway spruce rooted easier than blue spruce (15 percent) and only a few (3 percent) of the blue spruce air-layers developed roots.

3. The best results were obtained when the air-layers were applied during April before active shoot elongation had taken place.

4. Of the four types of wounds tested, the narrow girdle gave the best results. The wider girdle resulted in death of the branches above the girdle, while the scrap-

[1]Deuber, C. G., and J. L. Farrar. Vegetative propagation of Norway spruce. Jour. Forestry 38:578-585. 1940.

ing and the wound with the nail were not severe enough. These wounds callused over within a relatively short period of time.

5. Treatment of the wound with 0.5 percent indolebutyric acid resulted in a greater number of rooted air-layers, 30 percent for the treated ones versus 20 percent for untreated ones, and the roots started to form within a shorter period after treatment. Because of this earlier start the treated air-layers had a greater number of well-formed roots than the untreated ones at the time the air-layers were cut from the tree and potted. Concentrations above 0.5 percent were lethal.

6. The successful air-layers kept on developing rapidly after they were potted in a sandy-loam mixture.

7. On the air-layers treated with indolebutyric acid, the roots were grouped along the upper callus rim of the wound, while in the untreated ones some of the roots originated also along the part above the girdle which was covered with sphagnum moss.

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Computation of Volume in the Bitterlich Method of Cruising

Table 1 in Afanasiev's article[1] on Bitterlich's method of cruising is suggestive of a method for computing volume per acre in a way somewhat different from the volume-basal area ratio method outlined by Grosenbaugh.[2] Volume per acre can be computed by the following formula:

$$\frac{\text{Sum of (No. of trees} \times \text{volume} \times \text{per acre conversion factor)}}{\text{No. of sampling points}}$$

In this formula, "no. of trees" and "volume" are both by diameter and height classes, and "per acre conversion factor" is the same as that in Afanasiev's Table 1, Column 4.

In Figure 1, above, Grosenbaugh's data (Tables 3 and 5) are rearranged (as might appear in field notes) and the board foot volume calculated (figures rounded to nearest five board feet) for five sampling points.

A short-cut is available where the same volume table is used on successive cruises. Tree volume and per acre conversion factors can be combined into a table of volume per acre factors. Thus for the 14-inch d.b.h., 2 log class, one could multiply 141 × 9.36 and obtain the volume per acre factor of 1320.

D.b.h.	Merch. length in 16-foot logs 0	1	2	3	4	No. trees	× Vol.	× Conv. factor	
<6	· · · ·					4	× 0	× 50.96	= 0
8	· · · ·					4	× 0	× 28.66	= 0
10		⌐	·			7	× 39	× 18.34	= 5005
						1	× 63	× 18.34	= 1155
12		· · · ·	· · · ·			3	× 59	× 12.74	= 2255
						4	× 98	× 12.74	= 4995
14			⌐			6	× 141	× 9.36	= 7920
16				· · · ·	·	4	× 256	× 7.17	= 7340
						1	× 305	× 7.17	= 2185
18				· · · ·	·	3	× 336	× 5.66	= 5705
						1	× 402	× 5.66	= 2275
20					· ·	2	× 512	× 4.59	= 4700
								Sum	= 43535

Vol./acre = $\frac{\Sigma(\text{No. trees x vol. x conv. factor})}{\text{No. sampling points}} = \frac{43535}{5} = 8705$ or 8700 bd. ft./acre.

FIG. 1.—Sample calculations of volume from field notes.

Note that such factors are one hundred times the value of the ratios given by Grosenbaugh's Table 4. If such a table were made up, the calculations would be reduced to the following (field data not repeated):

No. trees	×	Vol./acre factor	=	
7	×	720	=	5040
1	×	1160	=	1160
3	×	750	=	2250
4	×	1250	=	5000
6	×	1320	=	7920
4	×	1840	=	7360
1	×	2190	=	2190
3	×	1900	=	5700
1	×	2280	=	2280
2	×	2350	=	4700
				43600

Vol./acre = $\frac{43600}{5}$ = 8720 or 8700 bd. ft./acre.

This method of calculating volume per acre is simple, direct, and easy to understand. Per acre conversion factors or volume per acre factors can be determined for any critical angle. The method is offered as an alternative to that outlined by Grosenbaugh.

Of further interest may be a readily grasped explanation by Grosenbaugh[3] of the Bitterlich method of cruising, including theory, application to growth studies, and reduction of errors in cruising.

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[1] Afanasiev, M. The Bitterlich method of cruising—Why does it work? Jour. Forestry 55: 216-217. 1957.

[2] Grosenbaugh, L. R. Plotless timber estimates—new, fast, easy. Jour. Forestry 50: 32-37. 1952.

[3] Grosenbaugh, L. R. Better diagnosis and prescription in southern forest management. South. For. Expt. Sta. Occasional Paper 145: 18-27. 1955.

Reviews

Conservation

By David Cushman Coyle. 284 pp. Rutgers University Press, New Brunswick, N. J. 1957. $5.

"Another conservation book! Why?"

Because 1958 is the 50th anniversary of general conservation in the United States, dating from the 1908 Governors' Conservation Conference. Coyle wrote a timely survey of historic, political, philisophical, and economic conflict which shaped conservation, and predicted a generally believable future.

Foresters, remembering 1875 (The American Forestry Association), 1891 (the forest reserves), and 1900 (The SAF) may consider their own efforts, rather than the Governors' Conference, the genesis of conservation. Similarly Coyle noted a "tendency for the hunting, camping, and fishing fraternity to preempt the name 'conservationist.'"

Part and chapter titles of the book portray the leadership of foresters and forestry without belittling other important facets of conservation. Part One: The Beginnings of Conservation. Chapters: Conservation Takes Form; Conquered America; The Coming of the Prophet (Pinchot; The Forest Service; American Forestry Techniques; The Gospel of Conservation. Part Two: Reaction, War, and "Normalcy." Taft and Ballinger; Interlude. Part Three: 1933 and After. Forestry Marches On; Soil Conservation; Water, Floods, and Navigation; Irrigation and Waterpower; Rural Electrification; River Basin Development; Conservation of Fuels; Conservation of World Resources; 50 Years of Conservation.

Coyle discusses each topic with admirable plausibility; then concludes with challenging pithy statements: ". . . the timber famine . . . has long since caught up with the American people. . . . The average American now thinks twice before buying the boards for bookshelves, and when he does they are . . . what his grandfather would have used . . . in the barn." ". . . the standard of living . . . continues to rise . . . the importance of tangible values will . . . diminish and that of the intangible, or sentimental, values will increase." ". . . the nature lovers are . . . to have increasing success in their demands for more reserved outdoor space."

Of world leadership, Coyle writes: "Conservation is a vital part of what we have to offer to a distracted world that is in need of a better way of life and . . . hope of peace . . ." ". . . the Western world . . . started the three lines of constructive change that . . . have been working . . . to transform human life—the scientific revolution, the anticolonial revolution, and the modern revolution against political and economic tyranny."

Here is no text of conservation statistics and techniques for the underclassman. Instead, it is enjoyable, provocative reading for the conservation worker and mature citizen. It checks the professional oldster's memory, tests his philosophies, and dislodges cobwebs. It gives the professional youngster background upon which to base policy determination he someday must make. It fronts the citizen with new concepts of responsibilities.

Politically the book veers a little left of center, but not offensively. Regarded as historical drama, the stagehands will miss actors among previous casts, but most leading stars are billed, and all will enjoy the play.

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Handbook of Hollies

Edited by Harry William Dengler. Natl. Hortic. Mag. Vol. 36, 193 pp. Illus. The American Horticultural Society, Inc., Washington, D. C. 1957. $3.

Few, if any, trees are more widely beloved than the English and American hollies, and their congeners too have a wide circle of admirers. Emily Bronte likened friendship to the holly tree and Robert Southey was led to say of the English holly: "Its glossy leaves ordered by an Intelligence so wise as might confound the Atheist's sophistries." It is a delight, therefore, to see this beautiful new book, so full of information and interest, which clearly will appeal to a large circle of readers.

This special issue of the National Horticultural Magazine is edited by Extension Forester Harry William Dengler of the University of Maryland, who is well known as an expert on hollies. The text has been prepared by 26 contributors, including Mr. Dengler. These collaborators appear to have been chosen with particular care, each having special knowledge and experience in his (or her) field. The editorial staff and directors of the American Horticultural Society formally express their appreciation to the Holly Society of America for making it possible to publish this handbook. The preface mentions the formation of the Holly Society of America in 1947, notes the great increase in holly interest as reflected in publications, landscaping, ornamentation, public concern, etc., and names persons to whom the authors are indebted for help. The table of contents is followed by an elaborate introduction covering 85 pages. This is subdivided into five chapters, one on folklore, legends, Indian tribal customs in-

volving holly, and country uses. A general discussion of world hollies follows, with an estimate of 300 to 500 species or more, the great majority of which are in Asia and Central and South America. North American hollies are discussed by Professor Fred C. Galle, with key and descriptions of 21 native species and descriptions of over a hundred cultivars. Dr. Shiu-Ying Hu of the Arnold Arboretum treats Oriental hollies with key and descriptions of 120 species and notes on 36 cultivars and hybrids. One hundred and fifteen horticultural varieties of English holly are annotated by Mr. Dengler himself.

Ten specialists develop holly culture in 44 pages of text, covering such topics as planting, pruning, propagation, insect and other pests, propagation and hybridizing, including a discussion of the cytology and genetics involved. This part alone is worth the price of the book to the many people interested in growing hollies whether for pleasure or financial profit.

The fourth main division of the book is "Uses," covering 58 pages with 13 authors. Topics included are landscaping, hedges, screens, topiary work, dwarfing or "bonsai," commercial orcharding, and holly collections. There is a list of arboretums and other public or semi-public gardens designated as official test gardens of the Holly Society of America. This portion concludes with a brief essay by Professor Ray R. Hirt titled "Adventuring with Hollies."

Any discussion of this book would be incomplete without reference to the superb illustrations. In addition to the colored front cover, there are 142 half-tones and 134 line-drawings, representing horticultural varieties and diseases and pests, botanical species, propagation methods, hedges and screens, hybridization, commercial orchards, table and other decorations, botanical varieties and forms, topiary work, and "bonsai." The line-drawings represent botanical species, cultivars, botanical varieties and forms, landscaping, and pruning methods.

The reviewer's overall impression of this book is so overwhelmingly favorable that he feels rather ashamed of himself to raise any item of possible criticism. The proof-reading has evidently been done with exceptional care. About the only error this reader has thus far observed is on p. 13 where the "X" of hybridity is omitted in *Ilex attenuata* Ashe, and the common name topel is misspelled "topal."

The book does not purport to be a botanical monograph of the genus Ilex but yet with its keys and descriptions of 141 species it makes an invaluable reference for the taxonomists, some of which gentry may raise the point that the double *i* in genitive patronymics, recommended in the last revision of the International Code, has not been followed with such species as *Ilex buswelli, curtissi,* and *cuthberti.*

Perhaps because holly has "the fatal gift of beauty" it may seem like a desecration to holly enthusiasts that some hollies, such as American, English, and the Guiana holly (*I. guianensis*) of tropical America are sources of timber. However, purposely or not, the authors of this handbook refrain from mentioning timber in their treatment *Uses of Holly.*

WILLIAM A. DAYTON
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Roads, Rails, and Waterways (The Army Engineers and Early Transportation)

By Forest G. Hill. 226 pp. Illus. The University of Oklahoma Press, Norman. 1957. $4.

The purpose of the book, explains the author, is to relate the invaluable contribution made by the Army Engineers in the opening of the West and the conquest of a continent during the half century between the War of 1812 and the Civil War. The author achieves this in a manner that results in considerable "backtracking" in each chapter and this reviewer found it quite confusing at first reading.

The Continental Congress authorized General George Washington on June 15, 1775 to appoint a Chief Engineer for his army, and it is from this date that today's Department of the Army Corps of Engineers dates its beginning. The author, however, dates the official beginning from March 16, 1802 when an Act of Congress created the present Corps of Engineers and directed that it be stationed at West Point and constitute a military academy. This Act authorized five engineer officers and ten cadets for the Corps, and directed that the Chief Engineer be the superintendent of the school.

It wasn't a school in the present day sense during the first ten years. The 71 cadets who graduated during that period received only limited and irregular instruction in the classrooms. They were more frequently engaged in helping with the construction of coastal defenses, vocational training as it were.

The present guide lines were established in 1817 when Major Sylvanus Thayer became superintendent. He promptly introduced such modern ideas as a four year course, regular terms, ranking of students according to scholarship, use of cadets as assistant professors, and more individual instruction, innovations that made "The Point" the first real engineering and technical school in the nation.

The Academy remained under the direction of the Engineering Department of the War Department until the Civil War. It was the sole source of college-trained civil and topographical engineers until Rensselaer Polytechnic Institute of Troy, New York began a one year course in civil engineering in 1835. It was not until 1845 that engineering courses comparable to that at West Point were established—at the Naval Academy, Annapolis, and at Union College, Schenectady, New York.

Prior to the War of 1812 the Engineers were busy surveying and constructing coastal defenses. Following the close of that war both Presidents Madison and Monroe

urged on Congress the great need of the country for roads and canals to make the new frontiers accessible and strengthen the military protection. It was proposed that the military engineers be assigned to survey and construct roads and canals important to the national interest. By 1823 the engineers were making surveys (and furnishing the instruments) for turnpikes, canals, harbors, and even lead mines.

When railroads came into the picture it was a simple interpretation to include them although they were not mentioned in the General Survey Act of 1824. Soon railroads "stole the show" and engaged much of the time of the engineers. Fourteen army engineers surveyed and directed the construction of the Baltimore and Ohio Railroad between 1827 and 1830. Ten of these West Point graduates later resigned from the Army and made railroad engineering their career. Their example was followed by many others with the encouragement of the War Department. West Point, apparently deliberately, turned out more engineer officers than the Army could place, with the sole idea of getting them into the private firms that were opening up the West.

Opposition to railroad aid developed in Congress and in 1838 it was prohibited by low. In the meantime the need for river improvement became obvious. In 1824 Congress appropriated funds to remove snags and sandbars from the Mississippi Rivers. The first snagboat was completed and went into operation on the Mississippi in 1829; a second in 1832.

But then came a loss of interest in such work. Congress made no important appropriations for river and harbor work from 1838 to 1852. Business picked up again in 1853, with the engineers busy exploring routes for a railroad to the Pacific, and constructing new roads and lighthouses. The engineers showed an insatiable desire for knowledge in every field that would help the railroads in particular. They collected data on rainfall, snowfall, temperature, humidity, the nature of the soils, the existence of coal, and the possibility of obtaining water from artesian wells. They amassed material on zoology and botany. With their work and the information gathered they stimulated the westward expansion and the rapid economic growth of the nation.

Students of early Americana, the history of engineering schools, roads, canals, and railroads, and of the Corps of Engineers will find the book of particular interest and well documented.

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Department of the Army

The Empire Forestry Handbook, 1957

144 pp. Published by the Empire Forestry Association, London, England. 1957. 20s.

Six previous editions of this useful volume were published beginning in 1930. There is nothing comparable to it in the United States and Canada, although a similar handbook for North America would be a welcome addition to the forester's reference library.

Divided into eight sections, the *Handbook* starts with a complete directory of officers and members of the Association, about 1,600 names and addresses. To test how inclusive the list might be, I looked up and located an Australian forester whom I had not seen for 25 years and of whom I had lost track.

Another valuable section is the second, containing a directory of all Commonwealth forest services, plus certain services outside the British Commonwealth and the FAO of the United Nations.

Still other sections are devoted to departments and institutions connected with Commonwealth forestry; forestry societies of the Commonwealth; and principal forest research organizations of the world. Of special reference value is an up-to-date selection of periodicals dealing with forestry and related subjects.

A section of useful information for forest officers, it is followed by the last, and largest, "British Standard Nomenclature of Commercial Families." This chapter also contains notes on sources of supply and on index.

Established in 1921 by Royal Charter, the Empire Forestry Association is not an official organization but a body of foresters and persons interested in forestry. The Association's periodical publication is the *Empire Forestry Review,* issued quarterly.

The Association and the *Review* provide a world-wide forum for the exchange of information among foresters of the British Commonwealth.

HENRY CLEPPER

Publications of Interest

Patterns of Genetic Variation in Sugar Maple, Ohio Agricultural Experiment Station Research Bulletin 791, by Howard B. Kriebel, adds to the basic knowledge necessary for tree improvement. The items covered for this species are: tolerance of climatic extremes, time of growth initiation and cessation, physical characteristics, growth rate, and other physiological characteristics, and variation in relation to the ecotype concept. Much of this publication is a condensation of Dr. Kriebel's Ph.D. thesis at Yale University.

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Chain Saws Pay Off on the Farm is a 27 minute 16mm color motion picture published by the Homelite Division of Textron, Inc. It shows how farmers may increase income by cultivating trees as a crop and trains the viewer in the safety and use of the chain saw.

Color prints for group showing may be obtained on loan from: Farm Film Foundation, 1731 Eye St., N.W., Washington 6, D. C. The film is also available free to television stations from Victor Kayfetz Production, Inc., 1780 Broadway, New York 19, N. Y.

This is a companion film to a previous one, "Chain Saw Safety Pays Off."

Current Literature

Compiled by MARTHA MEELIG, *Librarian, State University College of Forestry at Syracuse University*
Range Management Section Complied by Division of Bibliography, Library, U. S. Department of Agriculture

General

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The Trees on Your Street. By Desmond Muirhead. 36 pp. Illus. Portland (Oregon) General Electric Company. Manager, Rural Services, 621 S. W. Alder Street. 1957. $2.

Farm Forestry

Ten Years of Experimental Farm Woodland Management in the Southern Appalachians. By R. A. Campbell. 11 pp. Illus. Southeastern Forest Expt. Sta., Asheville, N. C. 1957. Sta. Paper No. 83.

Forest Economics

Forestry Tenures and Taxes in Canada. By A. M. Moore. 315 pp. Canadian Tax Foundation, 154 University Ave., Toronto 1. 1957. $3.

Log Grades and Lumber Values in a Second-Growth Pine Operation. By J. A. Zivnuska, R. F. Grah and E. A. Shideler. 5 pp. Univ. of California School of Forestry, Berkeley. 1957. Calif. Forestry and Forest Products No. 1. Mimeog.

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The Forest Resources of Southeastern Minnesota. 60 pp. Illus. Office of Iron Range Resources & Rehabilitation, St. Paul 1, Minn. 1957.

Land Use

The Federal Lands: Their Use and Management. By Marion Clawson and Burnell Held. 536 pp. Illus. Johns Hopkins Pr., Baltimore 18, Md. $8.50.

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Forest Insect Conditions in Arizona and New Mexico 1956. By F. M. Yasinski and D. A. Pierce. 18 pp. Illus. Rocky Mt. Forest and Range Expt. Sta., Fort Collins, Colo. 1957. Sta. Paper No. 26. Mimeog.

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Coniferous Plantation Growth in Central and Southern Maine; a Preliminary Report. By H. E. Young. 3 pp. Univ. of Maine Forestry Dept., Orono. 1957. Tech. Notes No. 46. Mimeog.

Patterns of Generic Variation in Sugar Maple. By H. B. Kriebel. 56 pp. Ohio Agric. Expt. Sta., Wooster. 1957. Research Bul. No. 791.

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Wildlife Management

Mammals of the Great Lakes Region. By W. H. Burt. 248 pp. Illus. Univ. of Mich. Pr., Ann Arbor. 1957. $4.75.

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Le Traitement Préservateur des Poteaux de Clôture par des Procédés sans Pression. By M. J. Colleary. 33 pp. Illus. Ministère du Nord Canadien et des Resources Nationales. Div. des Forêts, Ottawa. 1956. Bul. No. 107.

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Society Affairs

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SCHOOL BOX SCORE
1958 MEMBERSHIP

	Student Applications Received		
	Jan. 1958	Total 1957	Total 1958
Alabama Polytechnic Institute	0	19	0
University of California	0	30	0
Colorado State University	1	19	1
Duke University	1	13	1
University of Florida	11	6	11
University of Georgia	27	86	27
University of Idaho	1	19	1
Iowa State College	6	35	6
Louisiana Polytechnic Institute	3	18	3
Louisiana State University	1	41	1
University of Maine	7	31	7
University of Massachusetts	0	10	0
Michigan Coll. of Mining & Tech.	3	29	3
Michigan State University	0	24	0
University of Michigan	2	14	2
University of Minnesota	0	28	0
University of Missouri	6	62	6
Montana State University	0	45	0
State University of New York	1	25	1
North Carolina State College	0	36	0
Oregon State College	2	29	2
Pennsylvania State University	2	32	2
Purdue University	15	18	15
Utah State University	20	5	20
University of Washington	7	27	7
West Virginia University	10	19	10
Yale University	1	7	1
Totals	127	727	127

SECTION BOX SCORE
1958 MEMBERSHIP

	Applications Received[1]		
	Jan. 1958	Total 1957	Total 1958
Allegheny	12	68	12
Appalachian	5	71	5
Central Rocky Mountain	1	24	1
Central States	15	30	15
Columbia River	3	55	3
Gulf States	5	84	5
Inland Empire	1	21	1
Intermountain	20	6	20
Kentucky-Tennessee	0	8	0
New England	9	62	9
New York	4	37	4
Northern California	0	39	0
Northern Rocky Mountain	0	49	0
Ozark	9	92	9
Puget Sound	9	61	9
Southeastern	40	132	40
Southern California	0	3	0
Southwestern	0	7	0
Upper-Mississippi Valley	7	69	7
Washington	1	10	1
Wisconsin-Michigan	8	84	8
Totals	149	1,012	149

[1]Students, Junior, Affiliate, Associate (Initial) grades only.

The President's Column

I appreciate deeply the honor you have bestowed in electing me to serve as your president for the coming two years. But I am also quite mindful of the obligations and responsibilities the office entails and, in return for your expressed confidence, I pledge my sincere intention to carry on to the best of my ability in maintaining the Society at the highest professional level and advancing its program. I know that I reflect the resolution of the entire Council membership in this pledge.

I am fully aware that the high standing the Society has attained among professional societies and the striking progress it has made in recent years have been due in very large measure to the unstinting and imaginative efforts of Henry Clepper, Audrey Warren, Arthur Meyer, and the other members of the Washington office staff. To these people who carry on the real work of the organization so effectively, the Society owes a great debt of gratitude. Without their unfailing assistance, the president's office would indeed be a slender reed on which to lean.

I want to take this opportunity to congratulate you on the outstanding Council you have chosen. The five men reelected will bring important experience and continuity to the work of the Council, and the new members will add definite strength. Public and private forestry and educational agencies are ably represented in the group, which also has good geographic distribution, but the important consideration is the stature of the individuals elected and their recognized capacity for working for the common good. With the assistance of such a highly qualified group, I know that we can look forward with confidence to continued progress during this biennium.

A word is also in order with regard to the election of Fellows. The 16 men who have been so honored, just over half of the number nominated, represent the largest group yet elected and give support to the revised electoral procedure followed this year, with the Section and subject Division chairmen participating in the balloting, along with the Fellows and members of the Council. I know that the Society membership joins me in congratulating the new group of Fellows whose contributions to the profession have been recognized in this signal honor.

In recent years, decisive steps have been taken to increase enrollment in the Society, with the result that today our rolls include the names of 11,600 members in the several categories. This very creditable showing has been the result of persistent efforts by the membership chairmen of the Sections, with the cooperation of individual members of the Society. It is particularly heartening to note the significant number of student members, for in this group lies the core of our future voting membership.

Heartening as our membership growth has been, it is still far short of its potential, with an obviously large proportion of the graduates of our forestry schools who are not now, and in far too many cases never have been, associated with the Society. The various Chapters can do, and in fact are doing, much to stimulate the interest of these men in joining the Society. But an even greater opportunity and responsibility lies with our schools, in stimulating the kind of professional concept and attitude that makes sustained membership virtually mandatory. An enrollment goal of 12,500 has been set for 1958, and I urge you all to give support to that objective, in bringing to the attention of prospective members the opportunities for professional service and the satisfaction that is to be derived from participation in the Society's program.

In the conviction that the several members of the Council have messages for the membership fully as important as those the president may present, it has been decided to convert this monthly report to The Council's Column, beginning in February. I am sure the results will be much more stimulating than my continuous monthly contributions. Under the new program, my next report will be made to the membership in the July issue.

To each and every member of the Society, and on behalf of the officers, Council, and staff I extend best wishes for the New Year.

George A. Garratt

Coming Events

Southern Pulpwood Conservation Association

The Association meets January 20-24, 1958, in the Dinkler Plaza Hotel, Atlanta, Ga.

Ozark Section

The Ozark Section will meet January 24-25 in Russellville, Ark., at the Hotel Pearson. Theme: "Land Use in the Ozark Highlands."

Southeastern Section

The Southeastern Section of the SAF will meet January 30-31, 1958. Headquarters: Dixie Sherman Hotel, Panama City, Fla.

Allegheny Section

The winter meeting of the Allegheny Section will be held February 13-15 at the Penn-Sheraton Hotel, Pittsburgh, Pa.

Appalachian Section

The annual winter meeting of the Appalachian Section is scheduled for February 14-15, 1958 in the Sir Walter Hotel, Raleigh, N. C.

Report of Officers, Staff, Committees, Division and Council Meetings

Fifty-seventh Annual Meeting, Society of American Foresters

Syracuse, New York, November 10-13, 1957

Report of the President

DeWitt Nelson

It is with humble pride that I present to you, the professional foresters of America, my second and last report as president of the Society of American Foresters. It has been a rare privilege for me to serve as a member of your Council for three terms and as your president for one term. The association with foresters from over the nation has been a rich experience. For your help, support, and loyalty throughout these years I express my sincere gratitude. On behalf of Mrs. Nelson, who has enjoyed this experience with me, who has seen to it that I met certain deadlines and who has given up many evenings and weekends while I worked on Society Affairs, I express our double appreciation for the honor which you bestowed upon me.

During the past two years that the present Council has held office the Society has continued to grow, serve, and prosper. Our membership at the present time totals 11,600. Our net increase in membership in all grades during the current two years has been approximately one thousand. Never before have the voluntary, as well as the automatic, advancements in membership grades been so strong. Our membership goal, which we hope to achieve in the midyear of 1958, is 12,000. I am confident that we can accomplish that objective.

Growth in membership is as essential to the general health of the Society as growth is to the individual. I cannot sufficiently thank the devoted membership committees in our Sections, Chapters, and schools for all they are doing to strengthen our Society in both numbers and quality.

It is interesting to note that the Southeastern Section continues to be the largest, with the Columbia River Section a close second. Together these two Sections have nearly 2,500 members, almost twenty percent of our total.

Every organization, to be successful, must be sound financially and must conduct its business within its financial limits. This your Society has done. Much of the credit for this goes to our business manager, Miss L. Audrey Warren, who has served the organization for nearly thirty years.

It is expected that, by the end of the year, the Society will have the largest financial resources in its history. We will meet our estimated income of $153,000 and our net income will exceed expenses by over $5,000. In addition, the Society has investments of approximately $21,000 and we have on deposit about $44,000 of operating funds, earning at least three and one-half percent in eight building and loan association accounts. It is interesting to note that during the past ten years our income has increased approximately 147 percent. This is primarily due to increases on the membership rolls. Likewise, our costs have risen—it takes more people to serve our growing organization, and as we all know operating costs have risen in every category. While our financial position continues to be sound and the activities of the Society continue to grow within our dollar limitations, I do not believe that we can be complacent about either our financial structure or the areas in which we serve the membership and profession.

There are untrodden fields in which the Society should become more active. We should, in my opinion, establish a grade recognizing a high level of professional competence for those men who can qualify for such recognition by a set of standards established by the Society. This subject is on today's agenda for your discussion and exploration. As the Society embarks on this and other important activities, additional funds will be required. We must recognize that new services and new activities will require new money. As we enter these new fields, we as members must be willing to carry our share of the financial burden.

In the field of publications I am happy to report a successful two years. Over 8,000 copies of *The Forestry Handbook* have been sold. This was published for the Society in 1955 by the Ronald Press Company of New York. Its sales continue to hold up well. Royalty returns to the Society have appreciably exceeded our original cash expenditure on the book. A committee has been appointed to review the book's various sections with a view to the need and nature of revision.

More than 10,000 copies of the bulletin "Forestry as a Profession," written by our editor, Arthur B. Meyer, have been sold during the past year. This bulletin is being widely used in career counseling in high schools. Our editor worked with The American Forestry Association on "Careers in Forestry." That Association has received a $5,000 grant so that they may make this material available to the schools throughout the nation.

Last year we published a very valuable bulletin titled, "Forest Practice Developments in the United States, 1940 to 1955," compiled by a special committee of the Division of Silviculture under the chairmanship of Dr. Kenneth P. Davis of the University of Michigan. Copies will be available at the Division of Silviculture tomorrow and the Division of Forest Management on Wednesday. Price—$1.00.

The revised edition of *Forestry Terminology* is now in the hands of the printer and proofreaders. It will be ready for distribution early in 1958.

Forest Science has been firmly established as a leading scientific journal with a growing world-wide circulation.

Our major publication and our main line of communication is the JOURNAL OF FORESTRY which now goes to nearly 13,000 readers throughout the world. To the editor, our 11 associate editors and our advertising representative I express the appreciation of the Society for a job well done. They have worked off a large backlog of papers and now offer prompt and timely publication of articles. The JOURNAL's advertising lineage and revenue continue to grow —for this we salute Lloyd Thorpe. We have recently employed an assistant editor on a half time basis to help facilitate production of the JOURNAL, *Forest Science*, and other publications. We anticipate that this will make it possible for our editor, Arthur Meyer, to get into the field for current reporting and article development purposes.

We are all familiar with the popular request for more JOURNAL articles dealing with the programs and problems of practicing foresters. To you again today I repeat that only the practicing foresters can produce such material. A number of us have waged a campaign on this problem during the past two years with only modest success.

I also repeat that I know the self-disciplining that is required to produce such material in acceptable form. But you need and we need to know what you are doing in the woods—the new methods and techniques you have developed and are using. Many of the new developments will be applicable in other forest regions as well as your own. Let us use our JOURNAL as a real line of communication so we may keep each other fully informed on what is happening in the woods as well as in the laboratory. I am suggesting to my successor that he appoint a special committee to work on this problem. For me, one of my most difficult but certainly one of the most rewarding assignments I have had has been the monthly President's Column. I appreciate the responses that I have received from the membership.

During the two years that the present Council has been in office, there have been four meetings. These meetings have been reported in full in the JOURNAL, and I shall not review them here. However, it should be emphasized that as a result of thorough discussion around the conference table, together with full deliberation prior to taking a vote, the Council arrived at more than ninety percent of its decisions by unanimous vote.

Two actions by the Council, taken at its meeting in June 1957, were by unanimous vote even though each member realized that the actions would be criticized by certain members. These votes had to do with the abolishment of the Division of Private Forestry and the Division of Public Relations.

The Division of Private Forestry has tended to create a vocational group within the Society, as would be the case if there were Divisions of Federal Forestry, State Forestry, or Farm Forestry. The Council, after long study of this trend, was reluctantly forced to the conclusion that the division should be discontinued, as it was not in conformity with Article XII of the Constitution. This division will, however, hold a meeting on Tuesday morning.

Although the Division of Public Relations did not create a vocational group, it did tend to center discussions of techniques and progress in public relations in one meeting. In the opinion of many Society members, public relations applies to all Divisions and Sections, and should not be set apart as if unapplicable to other Society activities. In discontinuing the Division of Public Relations, the Council urges that this important aspect of our profession be given more emphasis in the technical subject Divisions. The officers of the Division of Public Relations decided not to hold a session during this annual meeting.

No president of the Society has ever had a more deliberative, conscientious, and hardworking Council than I. As this will be the last Society Affairs session at which I shall give a report, I take this opportunity to thank them for their ever ready cooperation and assistance.

Each year the size and quality of our annual meetings improve. Likewise, the participation, breadth of subject matter and objectivity of the Sections and Chapters continues to expand. I have had the privilege of attending and participating in meetings with 13 of our 21 Sections. In each Section I have been impressed by the caliber of men and the leadership abilities of those who are making forestry what it is today—that of building permanence into one of our great extractive industries. The value of our Sections and Chapters as a professional forum can not be over emphasized. Here is where we have the opportunity of exchanging ideas and philosophies with men who speak a common language. There are bound to be differences of opinions because we are dealing with a dynamic subject that has many variables under many different conditions. Properly employed this professional forum will make the Society more effective and result in more rapid development and application of new knowledge.

An announcement, which it now gives me particular pleasure to make for the first time publicly, concerns our long-proposed study of education in forestry and related natural resource fields. Dated October 15, 1957, the Society received notification from the Old Dominion Foundation, Inc., of New York that a grant of $39,500 in support of the study had been authorized.

This study, which the Council hopes to start early in 1958, will be a companion study to the survey of forestry and related research, completed by the Society in 1955.

A study of education in forestry and related natural resource fields is long overdue. The last national survey of this kind was made by the Society in 1932 under the direction of the late Henry S. Graves and C. H. Guise.

At its meeting on November 10 the Council officially accepted, in behalf of the Society, the Old Dominion Foundation's grant, and took such preliminary action as was necessary to start the study. Reports on the organization of it, and its progress, will be published in the JOURNAL OF FORESTRY.

The objects of the study are threefold:

1. To review the progress of professional education in forestry and related fields during the past six decades (1898-1957). This appraisal is needed to determine whether the progress in education has been satisfactory and adequate in light of the nation's economic and social dependence on the forest resource and its products and services.

2. To summarize the current status of education in forestry and related fields (wood technology, forest-range management, forest-wildlife management, forest recreation, and other curriculums offered in the 37 professional schools of forestry. This summary will identify areas of strength and weakness, and define problems requiring solution (i.e., adequacy of existing schools, curriculums, faculties, and recruitment of students).

3. To set goals for professional education in forestry and related fields during the next quarter-century, based on the best available estimates of probable needs for wood, forage, wildlife, water, soil conservation, and recreation.

As the forestry profession matures and attempts to discharge its responsibilities to society, professional education must be appraised as to "how good" as well as to "how much." This is the challenging opportunity given the Society of American Foresters by the grant so generously provided by the Old Dominion Foundation.

In May 1957 Henry Clepper rounded out twenty years as executive secretary. During these two decades he has missed two meetings of the Society. In 1949 he was in the hospital for surgery; at the present time he is in Rome as an official member of the United States delegation to the ninth conference of the Food and Agriculture Organization of the United Nations. Although travelling at government expense, on appointment by the Department of State, he is the representative of the Society of American Foresters.

The Fifth World Forestry Congress will be held in Seattle late in the summer of 1960. Our Society will doubtless be called on to play a prominent role in the programming and arrangements for this historic gathering of foresters from all over the world. Hence, one reason I urged Henry to

accept the State Department's invitation was to enable him to observe and participate in a big international conference and thus be of maximum effectiveness, on behalf of the Society, at the World Forestry Congress.

The chairman of our Committee on International Relations, V. L. Harper of the U. S. Forest Service, is also absent from our annual meeting because of his attendance at the FAO conference in Rome.

One of the duties of the Committee is to press for adequate forestry recognition in U. S. Government programs having to do with resource management abroad. Through the activities of this Committee, our Society is moving into a position of influence and leadership in those aspects of international forestry which are, or ought to be, of particular interest and value to the profession of forestry in America.

The last two years have seen forestry move forward in great strides. In this forward march, dynamic economic and social forces create both cause and effect which are of immeasurable importance to foresters. To keep pace with the forces around us, the many sciences that combine in the practice of professional forestry must not only create new knowledge but must apply that knowledge promptly. We can exercise little control over the "causes" but we have great responsibilities in the "effects" that result from the impact of new demands upon our forest resources.

In closing I again express my deep appreciation to the Council, the staff, and the membership for the loyalty and support that you have given me during the past two years. The friendships, associations, and memories will ever be cherished.

Report of the Editor

The JOURNAL OF FORESTRY requires the major portion of our editorial effort in the Society office. We have, however, during the past year—as before—carried on other undertakings.

President Nelson has mentioned the creation of a committee that is currently engaged in determining the need and nature of changes and revisions of the *Forestry Handbook*.

He has also mentioned that the manuscript for the revised edition of *Forestry Terminology* has been turned over to the printer. It should be available early next year. The revision will contain roughly 175 new terms and definitions in forest genetics, aerial photography, and utilization, supplied by committee members. Definitions of fire protection terms have been revised to conform with the new Forest Service glossary. Some editorial changes have been made in the form of presentation and a few non-factual ones in wording. F. H. Eyre has most capably assisted in this task.

A proceedings of last year's annual meeting was edited, printed, and distributed to 1,039 registrants. An additional 115 copies have been sold. The registration fee and extra sales have covered the cost. We expect this year's proceedings to be out considerably earlier than in former years. A good portion of it is now at the printer.

We are now in the preliminary planning stages for publication of a book authorized by the Council with the tentative title of *American Forestry; The First Sixty Years*. The purpose of the book is to observe the Society's 60th anniversary meeting in Washington, D. C. in October 1960. Plans call for 19 chapters to be written by various Society members.

President Nelson also has mentioned that we prepared an adaptation of our bulletin on forestry as a profession that was included as part of a special issue of *American Forests* magazine in a campaign by AFA to interest young men in forestry careers. This material was subsequently reprinted and supplied to every high school in the country by AFA. We also prepared an article on the subject that was published in *Nature Magazine*.

The bulletin itself, "Forestry as a Profession," has been widely distributed from our office, almost 11,000 copies in a year, often one copy at a time. It is gratifying to know that we supplied something when there was a need for it. As I was asked to prepare this bulletin, I can observe that it is a modest presentation of a complex and rapidly changing subject. Like the boy's finger in the dyke, it cannot be considered permanently adequate. The Council's Committee on Forestry Career Counseling is giving thought to how much and what kind of effort should be expended on future publications on this subject.

This year's volume (948 pages) of the JOURNAL OF FORESTRY will be 72 pages larger than last year's. The proportionate space devoted to its various departments remains about the same, half being devoted to articles and notes, half to reviews, current literature listings, Society business affairs, and news items.

During the past year there has been a new trend developing in submissions. We received 116 articles and 59 notes for consideration between October 1956 and October 1957. As compared with the preceding 12-month period, this is a 4 percent reduction in the number of articles but a 23 percent increase in the number of notes.

The arbitrary classification between the two is based largely on length but to a degree also on subject matter. Actual volume of material would be about the same for the two years. If this trend holds we will see a larger proportion of space in the future devoted to short articles and note material.

Of the 116 articles submitted, eight were rejected and two were withdrawn by the authors. Of those accepted about one fifth went back to the authors for revision on the basis of recommendations from associate editors. Another one fifth had minor changes handled by correspondence. About the same proportion of acceptances and revisions holds true for notes. It is interesting to observe that of the articles sent back to authors for revision, ninety percent were so revised and resubmitted. This point, I think, speaks highly of the constructive nature of the associate editors' criticisms as well as the willingness of our contributors to accept and make use of criticism.

Another fact is apparent in these statistics. The high proportion of final acceptances—even though considerable revision may be involved—indicates that the editorial board is not by the power of veto molding the contents of the JOURNAL. Its members are far more concerned with the constructive problem of obtaining more and better contributions. We have made a concerted effort the past year to encourage submissions from foresters in private and industrial work. We have met with a little success in this but not so much as is to be desired. The effort is being continued.

Thanks to the good offices of Lloyd Thorpe, our income from advertising has increased again this year even though additional space has not been devoted to it. For 1957 it will gross about $33,000. This is a 300 percent increase since 1950.

The backlog of unpublished articles and notes remains at a manageable level—equivalent to about three months supply. I believe that in the

field of technical and scientific journals we offer unusually fast publication. Certainly it places us in the healthy position of being able to solicit material in almost any pertinent subject matter field.

In closing, may I on behalf of the membership of the Society express our thanks to the associate editors who have so competently and unselfishly given to the JOURNAL of their time and knowledge during the past year. And may I on behalf of those editors cordially invite not only your contributions, but your suggestions, ideas, and comments.

ARTHUR B. MEYER

Report of the Editor of Forest Science

Forest Science, in its third year of publication, seems well entrenched as a major outlet for the publication of forestry research and technical progress. Its circulation, based solely upon paid annual subscriptions and not upon Society dues, has held steady, 1,150 in 1956, 1,170 in 1957. A steady flow of manuscripts to the editor has permitted the publication of quarterly issues of 96 to 112 pages each. During 1957, the 400 pages published include 42 major papers dealing with all phases of forestry. The average quality of the papers received this year has been higher than before, more papers are planned specifically for *Forest Science,* and the number of submissions has been large enough to permit the editors to limit publication to those of high individual quality.

The major change in the management of the journal during 1957 has been the appointment of an assistant editor, F. H. Eyre, in charge of production of *Forest Science.* While the editor and the board of editors remain responsible for the choice of articles to be published, Mr. Eyre now processes papers for publication, once accepted. He brings long years of experience to his task, and greatly reduces the work load of the editor. The Council of the Society and its executive secretary deserve much thanks and credit for the establishment of a part-time salaried position in the Society office that will do so much to assure the continuity and quality of its scientific journal.

The second basic change in the editorial staff is establishment of an advisory board for review and refereeing of manuscripts. The highly technical content of many of the articles submitted makes desirable a flexible system of obtaining review. Most manuscripts are sent to a member of the advisory board who may review the manuscript himself, send it to a colleague, or do both. The editor also may send papers to anyone adjudged especially competent to evaluate a particular manuscript. In general, the views of two referees are obtained on each paper submitted.

While no formal terms of office have been set for members of the advisory board, it is thought that the initial terms should be staggered so that three new appointments or reappointments could be made by the governing editorial board each year. Such a procedure would give a definite 3-year term to each advisory board member after the original 1, 2, or 3 years, and would serve to distribute the load of the sometimes arduous and always unpaid professional task.

The same procedures of a staggered 3-year term might well apply to the editorial board, with appointments to be made by the Council of the Society. While the executive secretary of the Society probably must remain on the board, the other two positions could be rotated. It is recommended for consideration by the Council that the term of Professor Spurr end at the close of Volume 3 (1957), and that Dr. Harper at the end of Volume 4. Each man should be eligible for reappointment, and subsequent appointments should be made for a 3-year term.

During the year, the editor proposed a statement of editorial policy aimed to define the content of *Forest Science* in relation to the JOURNAL OF FORESTRY. It is urged that this statement be reviewed by the associate editors of the JOURNAL and an agreement reached.

On September 1, the editor left the University of Michigan on a 1-year leave of absence to study western forestry under the auspices of a fellowship granted by the National Science Foundation. During this period, Professor Kenneth P. Davis, chairman of the Department of Forestry, School of Natural Resources, University of Michigan, has consented to serve as acting editor, and is ably discharging the duties of this office.

Concerning its financial status, *Forest Science* is perhaps unique among biological journals in that it has paid its production costs from the first. We have not had to call on the National Science Foundation for financial support, even though this Foundation underwrote possible losses for the first three years. Part of the reason for this good financial picture is the result of substantial services contributed by the Society of American Foresters and the University of Michigan.

The estimated income and expense for 1957 and budget for 1958 are as follows:

Income	1957	1958
Subscriptions	$6,750	$7,050
Reprints (net)	1,250	1,500
Miscellaneous	200	250
Total	$8,200	$8,800
Expense		
Printing	8,100	8,350
Editorial expense	330	350
Miscellaneous	50	100
Total	$8,480	$8,800

The small estimated deficit of $280 for 1957 can be met out of substantial net earnings made during the first two years. *Forest Science* must live within its income, however, and in the last analysis its future depends on the maintenance of voluntary subscriptions. Any increase in the size of the journal must be supported by an increased subscription list.

At the last time a detailed breakdown of the subscription list of *Forest Service* was available, out of 1,208 copies 888 copies go to the United States, 105 to Canada, and 215 to 67 other countries. In the United States, there are 634 individual subscriptions, 111 from schools and libraries, and 143 from the U. S. government and other public agencies.

These figures indicate that American subscriptions are proportionately less than those from Canada and other countries. It would seem that we are relatively more successful in selling our scientific journal and our scientific results abroad than we have to our own foresters. It is also clear that we cannot live and grow without the support of individual foresters in the United States. Yet, the bulk of our new subscriptions come from abroad and the bulk of our cancellations have been from American foresters as individuals.

To those who are now subscribers, may we hope that you will continue your interest and support; to the rest of you, may we urge that you acquaint yourself with your major scientific journal—and to remind you that you may still obtain a complete file of *Forest Science* at relatively low cost.

STEPHEN H. SPURR

Report of the Standing Committee on Forestry Career Counseling[1]

The great nationwide expansion of forestry activity during and after World War II has created an unprecedented demand for foresters. As a direct result of this demand a shortage of trained foresters appears to exist. In the minds of some this shortage is not serious. How serious it really is or will become depends on many factors, of which the number of students studying forestry now and in the future is of paramount importance. Assuming the schools continue to graduate each year about the same number of foresters that have been turned out annually during the past few years, which may not be a valid assumption, and assuming also that the demand for foresters continues, as it surely will, estimates indicate an annual shortage of more than 1,000 foresters in the foreseeable future.

A shortage of technically trained people is, of course, not unique to forestry. Serious shortages also exist in other scientific and professional areas. The solution to this problem is obviously to interest more high school graduates in going to college. A recent survey discloses that only 38 percent of the nation's high school graduates go on to college. This relatively low percentage indicates a definite lack of interest in college training on the part of many high school graduates. Not all of those who choose to terminate their formal education at the end of high school are capable of or qualified for college work. But many are. Studies have shown that more than half of the top 25 percent of high school graduates fail to enroll in college. These students should be given every encouragement, and financial assistance when needed, to continue their education at the college level. They are superior students, many of whom would make excellent foresters. Our need is not just more foresters but high quality foresters as well. It is with superior students that the Society should concentrate its effort to interest more men in forestry as a career. Surely the Council had this in mind when authorizing the establishment of the Committee on Forestry Career Counseling and charging it with the responsibility of developing a program for the Society which, it was hoped, would stimulate students to study forestry.

Undoubtedly there are numerous considerations that deter many young men from studying forestry. The relatively low starting salaries paid young foresters has certainly been a determent. Fortunately, however, salaries are on the upswing and we can look to continued improvement. A more favorable salary scale will most assuredly help to interest a larger number of students in forestry. Salary will help, but salary alone will not be enough. We must attract intelligent purposeful people with a genuine interest in forestry. These are the people who will make successful professional foresters. In order to accomplish this, forestry must be sold as a profession. We have failed to do a very good job of selling in the past. All too often the vocational rather than the professional aspects are emphasized. The average layman has only a hazy concept of technical forestry, thinking of it in terms of lookouts, fire fighting, and smoke jumping, with an opportunity to hunt, fish, trap, and camp in the woods thrown in for good measure. It is the technical and professional aspects, not the vocational, that will appeal to the intellectual student.

There is no simple solution to the shortage problem. The problem has many facets, all of which merit attention if a satisfactory solution is to be found. With this thought in mind the Committee has attempted to suggest a comprehensive program, which if promulgated by the Society should stimulate interest in forestry as a career and ultimately mitigate any shortage of foresters.

In developing the proposed program the Committee sought the counsel and advice of engineering groups, who have been strikingly successful in their student recruiting programs, high school counselors, the various Sections of the Society, educators, and Committee members. That the task facing the Committee was a difficult one was clearly evidenced by the paucity of suggestions and ideas.

Specifically the Committee makes a number of recommendations which are presented under several broad categories.

Professional Status

As previously pointed out, one of the most important characteristics of forestry is its professional status. Unquestionably, forestry is attractive to students, in part at least, because it is a profession, similar in many respects to law or medicine. Without this professional aspect forestry would fail to attract many prospective students. The Society must constantly strive to strengthen forestry as a profession. There is need for a clear, precise definition of forestry which should not be so broad as to impair the professional aspects. The Society's concept of professional forestry is, of course, expressed in the membership requirements for the junior grade. These requirements should be maintained and perhaps made even more restrictive in the future.

The requirements and quality of formal training must be kept at a high level. The Committee believes this can be assured through a continuation of the Society's accreditation program, which has been so successful in improving the quality of forestry training during the past twenty years. Only through top quality instruction can forestry maintain its professional status.

Two states have registered forester laws and several others are currently considering registration legislation. In providing for registration a state legally recognizes forestry as a profession. Therefore, the Committee believes the Society should support registration in principle and lend assistance whenever possible to any state struggling with the problem of registration.

Forestry Education

When the forestry profession was young, there was fear in the minds of many educators that forestry might be oversold to prospective students with consequent crowded schools and serious unemployment for graduates. Fortunately, this viewpoint is not prevalent today. However, too many individuals and perhaps some of the schools are still too conservative in dealing with prospective students. The Society should encourage the schools to present an optimistic picture of forestry. Much can be learned from the engineers, who have been anything but conservative in glamourizing their profession. There will be no landslide of forestry jobs, but employment has improved and will continue to improve. This should be recognized by developing an aggressive recruitment policy.

Frequently students fail to become aware of the true nature of forestry until late in their scholastic careers and sometimes not until after graduation. Students should be properly oriented and indoctrinated, particularly at the freshman and sophomore lev-

[1]This Council Committee report was only summarized at the Society Affairs session but read in full as a paper at the meeting of the Division of Education. It is presented here in full, as dealing with an item of Society affairs.

els, so that they become thoroughly acquainted with forestry and know what to expect after graduation. Summer employment is a great aid in this respect and public agencies, particularly the United States Forest Service, have provided abundant opportunity for summer employment. On the other hand, summer jobs with private concerns have not been so numerous. The Committee recommends that the Society suggest industry consider the possibility of providing additional opportunities for summer employment.

With the professional and cultural aspects in mind the Committee believes there is need to improve forestry curricula by placing more emphasis on communications, mathematics, social science, and humanities. This may call for a reduction in vocational type courses. Surely, however, a strong well rounded curriculum providing a liberal as well as a technical education will be attractive to more students than one composed largely of vocational and technical courses.

The Society has not been exactly enthusiastic about the establishment of new schools of forestry, believing, perhaps, that existing schools could adequately satisfy the demand for forestry training. Unfortunately, however, many students residing in states without forestry schools are discouraged, if not prevented, from studying forestry because of the additional cost usually involved in going out of their state for an education. Therefore, states lacking forestry schools should be encouraged to consider the possibility of paying the out-of-state tuition for a student from that state to attend a forestry school in another state. The idea is not new, having been rather widely used by veterinary schools. A few examples exist in forestry. Noteworthy among these is the agreement the University of Vermont has with the University of Maine whereby students with two years of pre-forestry work at Vermont are permitted to enter Maine as juniors and pay in-state tuition. Vermont reciprocates by taking Maine students in one branch of agriculture under similar conditions. Widespread use of similar agreements would undoubtedly increase the number of forestry students.

However, when a state becomes adamant in its desire to establish a forestry school, the Committee recommends that the Society offer encouragement and perhaps assistance when, in the words expressed by the Council at its June 1957 meeting, "such new schools or departments are effectively staffed, properly financed and possessed of adequate facilities for professional education."

Industry Cooperation

The great expansion in industrial forestry during the post war period has created an unprecedented demand for foresters and has been responsible in no small measure for any current shortage of foresters. In view of this situation, the Committee believes that industry should and will be vitally interested in helping to reduce the shortage. Therefore, the Committee recommends that the Society solicit the cooperation of industry in the following ways:

During the past few years several large wood using concerns have been advertising effectively in national magazines. The quality of the advertising has been excellent and very impressive. One company, for example, recently received a national award for the quality of its advertising. Occasionally, the forester is mentioned but he has not been the primary subject of any advertisement. The Committee suggests that the Society request several of the larger concerns to feature and even dramatize the forester in their advertising, similar to the manner in which electronic and pharmaceutical concerns have been dramatizing engineers and medical doctors. This type of advertising would be most effective in non-technical magazines, newspapers, trade journals, and even high school and college annuals.

Industrial forestry scholarships and fellowships can have far reaching influences in helping to attract prospective students to forestry. Several concerns provide a number of scholarships and fellowships. Unfortunately, some of these are restricted to certain sections of the country and the total number available is relatively small. The Committee recommends that the Society encourage industry to offer additional scholarships and fellowships on a nationwide basis, particularly for students at the undergraduate level.

Another very effective way in which industry could be of assistance in helping to interest more students in forestry is through the media of junior logging congresses or forestry camps for selected high school students. This technique has been used effectively by industry in the Northwest and elsewhere. Therefore, the Committee recommends that the Society cooperate with industry in an expansion of this program.

Publicity and Career Counseling

As previously pointed out, laymen have little understanding of technical forestry and in this connection high school career counselors are no exception. One correspondent summarizes this explicitly by stating, "Too many of the counseling personnel seem to feel that a forester is someone who sits up in a lookout tower, plants trees, cuts down trees, or puts out forest fires, and that the primary qualification for a forester is someone who does not stand too high in his classes, likes to hunt and fish and is not particularly interested in dealing with people." In view of this situation, the Committee suggests that the Society request Sections and Chapters to delegate qualified members to acquaint high school counselors in their areas with the nature of forestry and its career opportunities. Perhaps each Section should appoint a standing committee to implement the program.

Literature dealing with forestry as a career should also be supplied abundantly to high school counselors and libraries. This likewise could be accomplished by the Society through the Sections. Several Sections are already doing this. There are a number of very good publications available free or for a nominal charge. Included among these are: (1) "Forestry as a Profession" by A. B. Meyer and published by the Society of American Foresters, (2) "Careers in Forestry," Miscellaneous Publication 249, U. S. Department of Agriculture, (3) reprints from the March 1957 issue of *American Forests* on forestry as a career, (4) "Forestry —Outdoor Career with a Future" reprinted by the American Forest Products Industries from the August 1955 issue of *Changing Times—The Kiplinger Magazine*, and (5) forestry school brochures. At least one member of the Committee believes there is need for an entirely new Society publication on forestry as a career. The Committee suggests that the Society appoint a committee to study the need for a new publication and, if needed, assume the responsibility of its preparation.

Radio and Television Programs

Two of the most effective media for selling forestry as a career could well be radio and television. The Committee suggests that the Society collaborate with industry and the various public agencies to develop a series of programs depicting the forester and the role he plays in managing the forest resource. This idea is not new, having

been used rather effectively a number of years ago by the U. S. Forest Service. In order to heighten interest, the Committee believes the series of programs should evolve around a story or plot and consistently use the same characters. Programs should be "canned" and made available to all radio and television stations.

The Society's Role

As previously indicated, the Committee believes that fellowships and scholarships can do a great deal to stimulate interest in forestry. Therefore, the Committee proposes that the Society establish one or more fellowships or scholarships, obviously the more the better, at the national or regional levels. The Committee further proposes that they be granted largely to undergraduate students. The Committee believes that this program could and should be financed by voluntary contributions from members. Contributions should be nominal, to encourage wide participation, and made at the time dues are paid.

National or regional essay contests, with cash awards, could also be used effectively to stimulate interest in forestry. Accordingly, it is suggested that the Society seriously consider sponsoring a series of forestry essay contests which might be conducted effectively in cooperation with industry and public agencies.

However, in the mind of the Committee nothing is more effective in recruiting forestry students than well planned talks effectively delivered by practicing foresters. Hence, it is suggested that the Society, through the Sections, prepare a roster of members qualified and willing to speak on forestry to schools, service clubs, garden clubs, 4-H clubs, and similar organizations. A roster of this type would be very helpful to schools and clubs searching for speakers on forestry and its career opportunities. It has been proposed by one correspondent that the Society consider the possibility of helping to defray the expenses of outstanding speakers when they are authorized to speak as representatives of the Society. The Committee believes this idea has merit but recognizes that financial limitations might preclude its adoption.

Several of the Sections have prepared talks which have been used by members when speaking on forestry as a career. One of these is appended to this report as an example of the kind of information which should be included in talks designed to stimulate interest in forestry.

The engineers have been especially effective in their recruiting through "Science Fairs" which are conducted for high school students. "Fairs" have been used effectively to "glamourize" engineering. Forestry could be "glamourized" in a similar manner. Therefore, the Committee suggests that the Sections and Chapters sponsor and help to conduct at least one "Forestry Fair" a year. The "Fair" could be held in conjunction with existing "Science Fairs." Little difficulty would be experienced in obtaining the cooperation of industry and public agencies on this worthy project.

Lastly, and perhaps most important of all, each member of the Society should become an enthusiastic recruiter in his own right. If each member took full advantage of every opportunity to sell forestry to prospective students, any shortage of foresters would quickly disappear.

Summary

The Committee believes that the shortage of foresters can be alleviated by interesting more students in forestry as a career. A number of suggestions are made by the Committee which, if followed, should materially increase the number of forestry students. These suggestions are as follows:

1. Strengthen the professional status of forestry by (1) maintaining the present Society membership requirements and perhaps making them more restrictive in the future, (2) continuing and improving the Society's forestry school accreditation program, and (3) supporting state registration of foresters.

2. Improve forestry education by requesting the schools to (1) present forestry in an optimistic manner to students, (2) thoroughly acquaint the students with the true nature of forestry early in their scholastic careers, and (3) place greater emphasis on communications, mathematics, social science, and humanities in the forestry curriculum.

3. Obtain greater industrial cooperation by asking industries to (1) provide more summer employment for forestry students, (2) dramatize the forester in their advertising, (3) offer additional scholarships and fellowships on a nationwide basis, particularly for undergraduate students, and (4) sponsor more junior logging congresses and forestry camps for selected high school students.

4. Improve publicity and career counseling by (1) requesting Sections and Chapters of the Society to delegate qualified members to acquaint high school counselors in their areas with the nature of forestry and its career opportunities, (2) supplying high school counselors and libraries with literature dealing with forestry as a career, assigning this responsibility also to the Sections and Chapters of the Society, and (3) appointing a Society committee to study the need for a new publication on forestry as a career and, if needed, to undertake its preparation.

5. Utilize radio and television as media for selling forestry as a career through Society collaboration with industry and public agencies to develop a series of programs depicting the forester and the role he plays in managing the forest resource.

6. Increase Society activities and participation by (1) establishing one or more undergraduate fellowships or scholarships financed by voluntary contributions from Society members, (2) preparing a roster, through Section cooperation, of members qualified and willing to speak on forestry to schools, service clubs, garden clubs, 4-H clubs, and similar organizations, (3) requesting Sections to prepare talks to be used by members speaking on forestry as a career, (4) promoting "forestry fairs," in Section areas, designed to "glamourize" professional forestry, and (5) encouraging each member of the Society to become an enthusiastic student recruiter in his own right.

R. I. ASHMAN
W. B. DEVALL
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L. M. TURNER
R. H. WESTVELD
T. D. STEVENS, *Chairman*

Appendix

FORESTRY AS A CAREER
To be used in High School Career Day Programs
Prepared by
Forestry Career Committee of
Central Louisiana Group
Society of American Foresters

I. INTRODUCTION.

The purpose of this talk is not to persuade all of you to become foresters, but to acquaint you with the opportunities offered by the career of forestry. I have been asked by the Society of American Foresters to discuss this profession with you. I will attempt to answer these questions in

the course of the following discussion:

1. What does a forester do
2. How do you get to be one?
3. How bright is the future?
4. What is the pay?
5. Who employs foresters?

II. WHAT DOES A FORESTER DO?

Forestry is a profession just as law, medicine, and engineering. However, forestry is a younger profession in this country. It is only about 50 years old in the United States, but several hundred years old in Europe. The forestry profession has come into its own in the last 15 years.

Forestry has been defined as "The scientific management of forests and forest lands for the continuous production of goods and services."

A forester is the indjvidual who is trained to carry on the "scientific management" so that the forests continue to produce the things we need. He is also trained in how best to harvest the crops grown in the forest and how best to make use of intangible services.

He knows about trees and soils, and something about wildlife and watersheds and the recreational uses of forests. He knows how to survey land, and build roads, and harvest sawlogs and pulpwood. He is trained in cutting forest products in such a manner that the forest renews itself and grows more products than it would if it were wild and unmanaged.

He knows something of the economics of the forest industries. He is skilled in fighting fires and in preventing and stopping the damage that comes from insects and diseases in the forest.

In addition to these and other technical matters the forester also works continually with people. He supervises timber harvesting crews and fire fighters and directs organizations in government agencies and industrial concerns. He works with the general public in the protection of forests from abuse and in bringing about an appreciation of the necessity for the wise use and conservation of all renewable natural resources.

Although forestry is concerned basically with land and resource management, individual foresters engage in fields of work which may vary from scientific research through business administration, teaching, and public relations.

Foresters may be employed by federal and state agencies, by universities, by pulp and paper companies, by lumber companies, by industrial and citizens organizations. They may work for themselves as consultants. They may work in fields closely allied with forestry such as soil conservation, wildlife management, arboriculture, certain phases of engineering, wood technology, and the manufacture and sale of wood products.

III. HOW DO YOU GET TO BE ONE?

Personal qualifications.—Success in any honorable, rewarding walk of life requires honesty, industry, reliability, and courage. Along with these a forester needs above average intelligence, initiative, self-reliance, the ability to work well with other people and to persuade them to his way of thought, scientific curiosity. Perhaps above all it is necessary for the forester to have a strong conviction as to the value of his work, and an intense interest in it.

Educational requirements.—The professional worker in forestry requires a minimum of a four-year college course. His education includes basic work in the sciences, engineering, economics, and the humanities. Following this basic work, training in fields of professional knowledge is required. As a minimum these fields must include silviculture, forest management, forest economics, and forest utilization.

There are certain colleges accredited by the Society of American Foresters at which a degree in forestry can be obtained. A Bachelor of Science in forestry can be obtained at these schools in four years. Many of them offer further work toward a Master of Forestry and a Doctorate of Forestry. In our state there are two colleges: L.S.U. and La. Tech, offering a degree in forestry which are accredited by the Society of American Foresters.

Field experience.—Although not required it is desirable for a young man to obtain some practical field experience prior to or during the time he is working for his degree.

IV. HOW BRIGHT IS THE FUTURE IN FORESTRY?

To give you some idea of the growth in forestry. In 1912 there were approximately 500 men in the United States with some technical training in forestry. It was estimated that in 1956 there were 17,000 professionally trained foresters in the United States. This growth demonstrates the expansion of the profession.

Further growth may be indicated by the fact that there currently exists a serious shortage of trained foresters to fill the demand.

In the foreseeable future there is a need for 800-1,700 foresters per year. Forest schools now are graduating 500-800 foresters per year. It is possible that only 500 will graduate and the need could be 1,700 making an annual shortage of 1,200 foresters per year. On the other hand if the schools graduate a maximum of 800 and the need is a minimum of 800 we could possibly break even, but this is not likely to happen.

This year the U. S. Forest Service wants 685 foresters, and the schools will graduate almost that many. If the Forest Service gets all they want, then no one else will be able to get any.

It is expected that in the future, barring economic upsets, the industries dependent upon forests for raw material will continue to expand and intensify their forestry activities. The management of publicly owned forests is also expected to intensify as an increasing population continues its demands for forest crops and its needs for forest services. New uses for wood and wood fiber may be expected to develop through scientific research. There is every reason to believe that there will be a continued and increasing demand for trained foresters.

Your chances of finding a job are excellent in either industrial or public employ. Your chances of finding a job that suits your abilities and satisfies your ambitions are also excellent, for the diversified nature of forestry work offers a rather wide degree of selectivity in fields of specialization.

V. WHAT IS THE PAY?

In considering a career different people lay emphasis upon different aspects of what they hope to get out of it. Nevertheless in any type of work—you are interested in the following: (1.) An income sufficient to support yourself and your family and a chance for advancement in relation to your abilities, (2.) Personal satisfaction in the work, (3.) A feeling that your work is important to society, (4.) An opportunity to develop the use of your abilities to the fullest extent possible.

These can be realized in the forestry profession. All in all it can be said that forestry offers a well rounded, diversified, and interesting type of work that is a source of great satisfaction to the men who by their aptitudes and capabilities are suited to it.

At the present time a graduate with a Bachelor's Degree in forestry can expect a beginning salary of between

$350-$450 per month. After five to ten years of experience in the field, a qualified man can expect to be making between $450-$600 per month. Foresters who reach top administrative positions can expect to earn $12,000 and over per year.

To reach the top administrative positions paying in excess of $12,000 per year it is desirable that in the pursuit of your education you take additional courses of speech, English, business administration, business law, mathematics, philosophy, psychology, and any of the other liberal arts.

VI. WHO EMPLOYS FORESTERS?

A. Federal Government
   1. U. S. Forest Service
   2. Soil Conservation Service
   3. Indian Service
   4. National Park Service
   5. U. S. Fish and Wildlife Service

B. State Government
   1. State Forestry Commission
   2. Extension Service
   3. State Wildlife and Fisheries Commission
   4. Universities and colleges

C. Private Industry
   1. Pulp and paper companies
   2. Lumber companies
   3. Treating plants
   4. Land holding companies
   5. Large private ownerships
   6. Railroads and newspapers

D. Self Employment
   1. Management consultants
   2. Timber buyers

E. Forestry Associations
   1. National
   2. Regional
   3. State

REGISTRATION BY STATES

Annual Meeting—1957

Alabama	4	Nebraska	1
Alaska	2	New Hampshire	24
Arizona	3	New Jersey	7
Arkansas	5	New York	218
California	15	North Carolina	13
Colorado	11	North Dakota	2
Connecticut	16	Ohio	17
District of Columbia	26	Oklahoma	2
Florida	7	Oregon	14
Georgia	19	Pennsylvania	58
Idaho	6	Rhode Island	3
Illinois	11	South Carolina	4
Indiana	2	South Dakota	1
Iowa	4	Tennessee	1
Kentucky	3	Texas	3
Louisiana	14	Utah	5
Maine	24	Vermont	12
Maryland	13	Virginia	18
Massachusetts	18	Washington	11
Michigan	37	West Virginia	8
Minnesota	11	Wisconsin	17
Mississippi	5	Canada	11
Missouri	10	Puerto Rico	1
Montana	5	Total	722

VII. For those of you who are interested in forestry careers you may obtain further information from the following sources:

Contact a local forester in your area and discuss with him the particular fields of forestry in which you are interested. Ask him where you can get more detailed information on specific subjects.

You can write or visit a forestry school for more detailed information on entrance requirements, curriculum, and the location of a forester in your locality to talk with.

Part-time or summer employment is being offered to prospective forest graduates by the U. S. Forest Service and many private industrial concerns, providing you are 18 years old. While it is desirable to take summer employment in forestry to round out your education, it is also a means whereby you can help finance your education.

Bristow Adams (1875-1957)

Professor Emeritus Bristow Adams, former editor for the New York State College of Agriculture at Cornell University and professor of journalism from 1914 to 1945, died in Ithaca, N. Y., Nov. 19, 1957, a week after his 82nd birthday. He was born in Washington, D. C., Nov. 11, 1875. He was elected secretary of the Society of American Foresters for the year 1914.

In 1906 "B. A." joined the U. S. Forest Service, serving with Dr. Herbert A. Smith in organizing the Office of Information, and in field work on various national forests. At Cornell, from 1916 to 1945 he gave, in the Department of Forestry, a course of lectures on conservation, which had its origin in his personal experiences at the beginning of "The Conservation Movement," at the Conference of the Governors in May 1908.

After 1944 Bristow Adams devoted his time and major effort to being the editor and manager of *"The Cornell Plantations."*

Reports to be Published Later

Due to the short interval of time between the annual meeting and the closing date for copy to appear in the January issue of the JOURNAL certain difficulties arose that prevented publication of two Committee reports in this issue. The report of the Committee for the Advancement of Forestry Education and the Report of the Committee on Safety will therefore be carried in the February issue.

Report of the Committee on International Relations—1957

Our Committee counts as outstandingly important in 1957 the plans and arrangements so far made for the Fifth World Forestry Congress. This next meeting of world foresters, the Fifth World Forestry Congress, is to be in the United States in 1960. It will be held on the campus of the University of Washington, Seattle, during the late summer of 1960. Early next year the State Department plans to appoint the Organizing Committee for the Congress.

Last year, at our annual meeting in Memphis, Tennessee, I reported on the apparent interest in and desirability of bringing this next World Forestry Congress to the United States. Promptly the Society of American Foresters passed a resolution favoring the United States offering to be host. Other national and regional bodies passed similar resolutions—the American Forestry Association, the southern Forest Farmers Association, and the Western Forestry and Conservation Association. In fact, the last-named Association was the first by nearly a year (December 8, 1955) to express a keen interest in favor of having the next Congress in this country.

The Council of the Food and Agriculture Organization of the United Nations accepted in June the invitation of the United States to be host to this next Congress. Although FAO has no direct responsibility for the congresses, it has played an important part in their organization and conduct.

In July, the president of the University of Washington, Dr. Henry Schmitz, invited the Secretary of State to hold the Congress at the University of Washington, Seattle, during the late summer of 1960. On September 13 the State Department announced that it had accepted Dr. Schmitz's invitation.

You will recall that the First World Forestry Congress was held in Rome in 1926, and since then they have been held in Budapest in 1936, Helsinki in 1949, and Dehra Dun, India in 1954. It is therefore gratifying that the next one will be held in Seattle in 1960.

The purpose of these congresses is to advance the science of forestry in its broadest meaning by providing an opportunity for the exchange of information and the development of ideas. In carrying out this purpose for the 1960 Congress, the next step is consideration of suitable subjects for discussion at the Congress by a technical panel of foresters from many countries at the Ninth Conference of FAO in Rome during November. Representing the United States at this meeting will be R. E. McArdle, chief of Forest Service; Henry Clepper, executive secretary of Society of American Foresters; and V. L. Harper, chairman of Committee on International Relations of SAF. After this meeting and by early 1958 we expect that a U. S. Organizing Committee will be formed. Then will start the intensive work of formulating the program for the Congress, of outlining the study tours, and caring for all the other things, including Conference arrangements.

While the news of the next World Forestry Congress undoubtedly holds our first attention, there have been other happenings in 1957 on the international forestry front that deserve mention.

A number of international technical meetings have been held in which foresters from the United States took part. The FAO/ECE (ECE stands for Economic Commission for Europe) International Consultation on Insulation Board, Hardboard and Particle Board, Geneva, January 21-February 5, brought together a very large group of world specialists in these fields. About one hundred technical papers were presented, many from the United States. The FAO Development Center in Watershed Management for Asia and the Far East, Hazaribagh, India, February 18-March 16, though not strictly an international meeting, brought together foresters from a number of countries and provided an opportunity for the United States to contribute through furnishing two of the leaders of the Center. U. S. foresters were official participants in the Ninth Session of the International Poplar Commission, Paris, April 22-May 4; the Fourth Session of the FAO Asia-Pacific Forestry Commission and Second Session of the Teak Subcommission, Bandung, Indonesia, June 4-21; and the Seventh British Commonwealth Forestry Congress, Australia and New Zealand, August 26-October 10.

In March of this year the director-general of FAO announced the establishment of a Panel of Experts on Education in Forestry, in accordance with the recommendation of the Fourth World Forestry Congress and with approval of the Eighth (1955) Session of the FAO Conference. The advice of the panel will be sought mainly with regard to university-level education leading to an academic degree of B.S. in Forestry or its equivalent. The panel will also be called upon to deal with the educational programs of ranger schools, with types of training programs for forest workers, and with means of informing land owners and the general public about forestry. Special attention will be given to the need for preparing a limited number of men for work in world forestry; this will include building up information for effective teaching in world forestry. There are six members of the panel from European countries, one from Central America, three from South America, two from Asia, one from the Pacific

FAIRFIELD OSBORNE, president of the Conservation Foundation, shown addressing the annual dinner of the Society of American Foresters at its 57th annual meeting in Syracuse, N. Y., November 13.

area, and Dean Hardy L. Shirley from North America as chairman.

In the field of forestry research, progress is being made in the establishment of an FAO-sponsored Latin-American Regional Forestry and Research Institute, at the University of the Andes, Merida, Venezuela. Through an agreement between the director-general of FAO and the Government of Venezuela, the Institute is now being operated on a provisional basis, and it is hoped that sufficient support will be forthcoming from Latin-American countries to permit permanent establishment. It now has a full-time staff of six and a part-time staff of eight persons. Research is under way in six fields, and two technical bulletins have recently been issued. The U. S. Government has offered the facilities of the Forest Service's Tropical Forest Research Center in Puerto Rico for cooperation with the Institute. A Latin-American Regional Forestry Research Committee has been set up in connection with the Institute, and U.S. participation in the work of the Committee is anticipated.

A number of forestry research institutions in the United States are members of the International Union of Forest Research Organizations. The next IUFRO Congress is scheduled to be held in Vienna, probably in 1961. The Society will be interested to know that the Permanent Committee of IUFRO is planning to hold one of its annual meetings in the United States in 1960, just before or after the World Forestry Congress. V. L. Harper and Clarence Korstian are the North American members of the Permanent Committee. Recently a new Working Group to promote international cooperation in forest disease research and control was established by IUFRO with J. R. Hansbrough of the United States as chairman.

The Society has continuing interest in the work of the International Commission for the Nomenclature of Cultivated Plants, related especially to tree improvement programs in which new varieties of trees are developed and named. Established in 1956 under the International Union of Biological Sciences, this Commission has 25 members from various countries representing horticulture, agriculture, and forestry. Elbert L. Little, Jr., member of the Tree Nomenclature Committee of the Society of American Foresters, is the forestry representative from this country. He will attend the second meeting of the Commission, London, December 4-6, 1957. The International Code of Nomenclature for Cultivated Plants, published in 1953, has been revised to make it equally applicable to horticultural, agricultural, and silvicultural crops. Also, the Commission is preparing rules for registering variety (cultival) names and has appointed a committee to work with the botanists on stabilization of scientific names of economic plants.

In connection with the recruitment of U. S. foresters for technical assistance assignments abroad, the Society's roster of members interested in such assignments, maintained at Washington Headquarters, promises to be increasingly useful. There are now approximately thirty U. S. foresters working with the United States' ICA Missions in foreign countries, and eight with FAO under its Expanded Technical Assistance Program. These foresters from the United States working abroad represent small increases over last year.

The training of foreign nationals in forestry in the continental United States and Puerto Rico has also been on a somewhat larger scale than in 1956. It is estimated that upwards of 150 foresters from 30-odd countries will have received such training. Turkey, Japan, Spain, and the Philippines and China, in the order named, sent the largest numbers of trainees. In addition, and for the third consecutive year, the U. S. Forest Service, under the sponsorship of ICA and in cooperation with FAO, offered a 3-months' short course in Tropical Forestry at its Tropical Forest Research Center in Puerto Rico.

As reported last year, the Society is one of a number of U. S. organizations participating in a program of international professional contacts with foreign nationals who have received training in the United States under the sponsorship of ICA. As of a recent date, the number enrolling as Corresponding Members in the Society had reached 27.

V. L. HARPER
Chairman

Some Problems in Administration of Current Membership Grades

This statement will serve as an introduction to certain problems of membership grades which are of concern to the Council. The problems we are raising center on the distinctions (or lack of them) which now exist between the grades of Member and Junior Member, and on certain related issues. A companion question is that of the names that should be used to designate grades. A number of Sections have endorsed the suggestion that the Society should designate present Members as Senior Members, and present Junior Members as simply Members.

The Council has been increasingly concerned with these problems in recent years. As a result, at the Berkeley meeting last June a special Committee was appointed by President Nelson to study membership grade problems. That Committee consists of E. F. Heacox, Washington; Myron Krueger, California; and R. H. Westveld, Missouri. Both that Committee and the Council are anxious to secure the fullest possible expression of thought and opinion on these matters. This part of our Business Affairs session is devoted to that end. It is hoped that each of you and particularly Section Delegates will enter actively into the discussion here, that you will continue the discussion in your own Sections, and that you will communicate Section views in detail either to the Council or the Heacox Committee.

I will try briefly to present the background for these problems, suggest certain possible solutions, and raise a number of relevant questions which we hope you will feel moved to discuss.

Problems in current administration of Member grade.—Persons are eligible for advancement to Member grade if (1) they are Junior Members, and (2) they are employed in forestry and (3) they have three years of forestry experience subsequent to the date the requirements for Junior Member were met. Given these three conditions a man may advance to Member provided he has the endorsement of three voting members and his Section's endorsement. A not uncommon case is that of Mr. Jones who graduated from an accredited forestry curriculum in June 1954 and was admitted to Junior Membership that autumn. He went to work immediately after graduation running property lines and cruising on a western national forest. He spent the ensuing three years at this line of work and in June 1957 applied for

advancement to Member grade. His application was endorsed by two of his college classmates who were Junior Members, by one of his college professors who had not seen him since graduation but had heard that he was doing well, and by the Section of which he was a member. Under normal procedures he was approved by the Council Committee on Membership and advanced to Member grade as of July 1, 1957. Had Mr. Jones not been eager for advancement, he could have remained a Junior Member for an additional 3 years. But in 1960 he would be advanced automatically to Member grade provided he continued in a forestry position during that period.

I cite this hypothetical case because it represents fairly the qualifications necessary for a forester to enter the grade of *Member*. Hence it reflects the *standard* on which Member grade is based. Clearly *Member* grade differs from Junior grade almost solely in the fact that a man has had 3 to 6 years of some kind of forestry experience subsequent to graduation from college. That experience need not have been diversified. It need not even have included work in those fields which many consider the core of forestry, so long as the time was spent doing something within the Society's broad definition of forestry. It would seem that this rather narrow distinction between Junior Member and Member grades might be recognized even better by simply having a single grade supplemented by the member's date of admission.

Incidentally, Mr. Jones having achieved the grade of Member, has now gone into the restaurant business where he anticipates having a long and profitable career. So long as he pays his dues each year and behaves himself he will continue to carry the title *Member of the SAF* until he goes to his grave.

A large amount of paper work on the part of Section officers, Washington office staff, members who serve as endorsers, and Council members is necessary to process the 300-odd applications for advancement of this kind which we have every year. This costs the Society dearly in cash and in the valuable time of Section officers and others. In the opinion of many who have studied the situation, the exisiting narrow distinction between Junior Member and Member is not worth the effort that goes into maintaining it. Under exisiting rules and procedures it seems highly probable that less than 1 percent of the Junior Members who wish to advance to Member fail to do so.

Why don't we make the distinction a more significant one? To do this under present procedures would require exercise of judgment (in accordance with standards which the Society has not yet laid down) by endorsers, Section officials, and Council members. As most of these officials do not know the applicants personally, judgment would have to be based on the written record. Present requirements for applications present a record which is very brief and which does not contain very much information that would be helpful in judging professional competence in marginal cases. In short, it appears to be impractical to enforce a greater distinction between Junior and Member grades within the present provisions.

Interest in a grade which would signify professional qualifications.—Your initial reaction to what I have just said might be: "Let's consolidate Junior Member and Member into a single grade." Before doing so, however, let's take a look at the case for a more sharply distinctive structure of grades. For example, a number of members have been suggesting in recent years that we should have in the Society a grade of membership which signifies, in some sense, thorough professional competence in forest land management. Suggestions for such a grade come most often from consulting foresters, members who have occasion to serve as expert witnesses, and others with a need to substantiate formally a degree of professional qualification well above the minimum standard currently applied to the grade *Member*. These people argue that the Society could perform an invaluable service to such members by establishing and administering effectively a grade of this kind.

A second significant argument emphasizes the role which such a grade could play in carrying out the Society's basic objectives of advancing professional standards and of securing public recognition. So long as the Society does nothing to distinguish broad land management competence from what may be highly skillful but none-theless narrowly specialized competence, we cannot expect the public to do so. If the Society is not interested in identifying the man whose background qualifies him to manage forest land in the broad sense of that term and to recognize him as different from the forester who is, let's say, a skillful forestry teacher but has never practiced the forestry art, surely no one else is likely to make this increasingly important distinction. So runs one line of argument in favor of greater grade distinctions. Regardless of whether or not one agrees with it in this specific form, it raises issues which should be carefully explored before any change in grade structure is adopted.

Some principles of graded membership system.—What would it mean to create a new grade of membership signifying substantial professional land management qualifications, beyond formal academic training? First of all, evaluation of professional competence, which presumably must be based in part on experience, would have to be done by people who know the applicant or who have ready access to those who do. Thus, the basic evaluation should be done at the Section level, not by a far-off Council or Washington office. The evaluating task would be a demanding one and could only be carried out successfully by members of wide and long experience. The Council would also have a major job to do in ensuring that the evaluating Committees in the several Sections conformed to uniform standards.

A second principle which looks fundamental to success of the kind of grade we're talking about is that of divorcing the grade structure from the dues structure. A lot of past tinkering with grades seems to have been motivated at least in part by the desire to get people into a higher dues bracket. The principle now largely in effect of letting a member's dues advance as he advances in age (and presumably in earning power) appears to be both a workable and an equitable way of handling dues. So the present proposal for a new grade of membership should in no way be made a device for enriching the treasury.

The cost of administering such a grade would, of course, be relatively high. It could be met by charging for this grade an application fee sufficient to cover these costs. Thus, the grade would include only those members who wished to take advantage of this form of professional recognition and the number of applications for it might be expected to be moderate.

A third important point to be considered is the danger that such a grade might lead to the formation of a clique which would attempt to dominate the rest of the Society. It would appear that this danger could be avoided if care were taken not to confer any additional membership privileges along with it. For example,

voting rights, rights to hold national or sectional office, and eligibility for all committees should remain uniform as between the proposed grade and the grade of Member.

Suggested qualifications.—If the principle of a membership grade reflecting land management qualification proves to be one which the Society wishes to maintain, then careful thought will have to be given to the specific qualifications which will be adopted as a minimum standard for such a grade. It would appear that such a standard should include (in addition to the academic training now required of Junior Members) a period of several years of forest land management work, reasonably well diversified among the various lines of activity that such work embraces. The standards should be drawn in such a way that most of the necessary qualifications could be documented. The particular types of activity that are to be considered as qualifying experience should be specified. The grade should be defined and qualified in such a way as to make absolutely clear that it identifies a forester who has demonstrated competence to perform forest land management work. It should be equally clear that such competence makes him neither better nor worse than other members whose central competence lies elsewhere.

I have used in this discussion the proposal for a grade reflecting recognized qualifications for professional forest land management. I chose this as the example because it is the concept that has been most actively called to our attention. It should be pointed out, however, that there may well be need and desire for grades signifying professional qualification in other areas of forestry such as wood utilization.

Affiliate member problem.— A final question concerns the relationship between Affiliate grade and the regular professional grades of membership. Affiliate grade has been the traditional grade in which men who have not had professional training in a school of forestry but who are vitally interested in the Society could become formally associated with it. Traditionally, those Affiliate members who have demonstrated their command of the academic foundations of forestry acquired through experience and self-education could advance to Junior grade and thence up the ladder of regular professional grades. As the years have gone on, however, fewer and fewer individuals have advanced from Affiliate grade, reflecting perhaps the increasingly broad foundation of scientific knowledge essential for modern forest practice in the United States. It seems timely today to review again the needs for an Affiliate member grade and what the relation of this grade to regular professional grades should be.

Some specific questions.—In order to focus the discussion, let me ask five questions. In posing them let me remind you that the Council and the Membership Committee are not now recommending any of the proposals I have discussed. We are actively seeking expression of the views of members on these matters.

1. Are there reasons not brought out in my discussion for retaining the existing distinction between *Junior Member* and *Member* grades?

2. If not, should this distinction be abandoned by consolidating the two grades and calling all who enter the Society on the basis of graduation from an accredited curriculum simply *Member*?

3. Should the Society seriously consider the establishment of a new voluntary grade which would certify to a man's competence in professional forest land management?

4. If the existing structure of grades is retained, should the term *Member* and *Senior Member* be adopted for the grades now identified as Junior Member and Member respectively?

5. Should Affiliate grade be continued? Should it be considered a non-professional grade from which advancement to Junior grade is only rarely possible?

HENRY J. VAUX
Chairman,
Council Committee on Membership

Discussion by the Council and Section Delegates

The question "Should regular membership grades and names be reconsidered?" was discussed in open session under the leadership of Henry J. Vaux, chairman of the Council Committee on Membership. Upon motion by C. F. Korstian, duly seconded, it was agreed that the Council Committee on Membership should continue study of the question and report back to the Council.

It was suggested by R. D. Forbes that the Council consider the exhibition at annual SAF meetings, of the works of art of members (including photography). The suggestion was accepted for further consideration.

Report of Council Meeting

A short meeting of the Council was held at Syracuse, N. Y., on November 10th, during the period of the Society's 57th annual meeting. Those present were as follows: President DeWitt Nelson, Vice President George A. Garratt, B. E. Allen, P. A. Briegleb, C. H. Coulter, S. G. Fontanna, M. K. Goddard, E. F. Heacox, J. S. Illick, J. H. Stone, and H. J. Vaux; together with Miss Audrey Warren, business manager, Arthur B. Meyer, editor of Society's publications, and Henry J. Malsberger, a guest. Executive Secretary Henry Clepper was absent, attending the 9th session of the FAO in Rome, Italy. It was noted that all meetings of the 1957-1958 Council had a 100 percent record of attendance.

Society Finances and Related Business Matters

Miss Warren gave a review of the Society's financial status indicating that, by the end of the 1957 fiscal year, the Society will have the largest financial resources in its history. Net earning of at least $5,000 will be realized, a substantial profit, in excess of $9,500 invested in the preliminary preparation of the *Forestry Handbook*, has been earned. On the motion of Dr. Illick seconded by Mr. Briegleb, the Council voted unanimously to have available a written comparative financial statement for future Council meetings.

The Society's operating procedures were also presented to the Council and members were apprised of the critical office personnel situation whereby, for for personal reasons, there have been resignations from five of the eight office employees. As a result the Council indicated its understanding of an unavoidable temporary decrease in office efficiency—until such time as new employees can be properly trained.

Forestry Handbook

Mr. Meyer reported that the Ronald Press, publishers of the *Forestry Handbook* proposed to revise the book, probably in 1960 and, perhaps, at 5-year intervals thereafter. A committee of two men for each subject division

has already been appointed. Their recommendations for revisions are to be presented not later than the spring of 1958.

Committee for the Advancement of Forestry Education

Dean Harold G. Wilm presented the report of this committee which recommended the continued accreditation of Montana State University. On the motion of Dean Fontanna, seconded by Dean Garratt, the Council voted unanimously to accept this recommendation.

The committee also presented revised standards for accreditation entitled "Bases for Accrediting Schools of Forestry." Upon motion of Mr. Goddard, seconded by Mr. Stone, the Council voted unanimously to accept, with minor revisions, the new accreditation standards.

This committee recommended that hereafter at least two members of the Committee on Advancement of Forestry Education, together with the executive secretary, constitute the visiting committee. Mr. Briegleb moved, Mr. Coulter seconded, and the Council voted unanimously, to accept the recommendation and that outside consultation be authorized, if needed.

A further recommendation of this committee that the salary scale for professional instruction be checked biennially by the executive secretary, starting 1958, and revised where necessary; and that a separate item relating to fringe benefits be included. On the motion of Dean Vaux, seconded by Mr. Briegleb, the Council voted unanimously to accept the recommendation. The committee was commended by the Council for its diligence.

Forestry Education Survey

Under date of October 15, 1957 the Old Dominion Foundation, Inc., authorized a grant of $39,500 in support of a two-year study of education in forestry and related natural resources fields.

The objects of this study are threefold.

1. To review the progress of professional education in forestry and related fields during the past six decades (1898-1957). This appraisal is needed to determine whether the progress in education has been satisfactory and adequate in the light of the nation's economic and social dependence on the forest resource and its products and services.

2. To summarize the current status of education in forestry and related fields (wood technology, forest-range management, forest-wildlife management, forest recreation, and other curriculums offered in the 37 professional schools of forestry. This summary will identify areas of a strength and weakness, and define problems requiring solution (i.e., adequacy of existing schools, curriculums, faculties, and recruitment of students).

3. To set goals for professional education in forestry in related fields during the next quarter-century, based on the best available estimates of probable needs for wood, forage, wildlife, water, soil conservation, and recreation.

As the forestry profession matures and attempts to discharge its responsibilities to society, professional education must be appraised as to "how good" as well as to "how much." This is the challenging opportunity given the Society of American Foresters by the grant so generously provided by the Old Dominion Foundation.

On a motion by Mr. Stone, seconded by Mr. Allen, the Council of the Society of American Foresters acknowledge with deep gratitude a grant of $39,500 authorized by the Trustees of the Old Dominion Foundation, Inc., in support of a two-year study of education in forestry and related natural resource fields, and accepts the grant in accordance with the terms outlined by President Ernest Brooks, Jr., in his letter of October 15, 1957 to Executive Secretary Henry Clepper.

On a motion by Dean Fontanna, seconded by Mr. Briegleb, the Council voted to authorize the president to appoint a committee of five to supervise the study of education in forestry and related natural resource fields made possible by a grant of $39,500 from the Old Dominion Foundation, Inc., and further authorizes the said committee to designate a director and such additional personnel as may be needed.

Committee on Membership Grades

Mr. Heacox, chairman of the committee, announced that no report would be made at this time; that discussion of the various grades, to be held at the Society Affairs session Monday afternoon, would be essential in preparing a report and proposed plan of action for consideration of the Council at its next meeting.

Future Awards for Achievement in Biological Research

In 1956 and 1957 the Council gave, from funds made available by an anonymous donor, two awards and cash payments for each year for outstanding achievement in biological research leading to the advancement of forestry. In presenting two awards each year the Council does not consider this action a precedent. Upon motion of Dean Fontanna, seconded by Mr. Heacox, the Council unanimously adopted the policy that hereafter dual awards will be made only on rare occasions; and, in fact, in some years no award may be made at all.

Honorary Membership

On the nomination of the Committee on International Relations the Council unanimously elected Dr. Carl Syrach Larsen, head of the National Arboretum in Denmark, to Honorary Membership.

Seed Certification

Dr. Illick made a progress report for the New York Section's Committee on Seed Certification. On motion of Dr. Illick, seconded by Mr. Heacox, the Council endorsed unanimously the principle of seed certification and requested that the Division of Silviculture undertake a study and make recommendations to the Council for needed legislation.

Forest Science

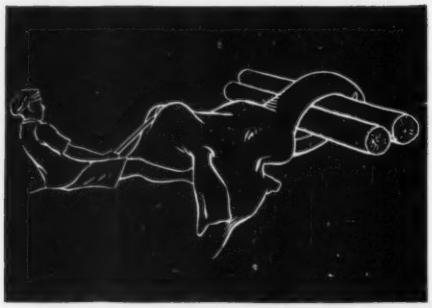
A report on *Forest Science*, prepared by Professor Stephen H. Spurr, was read by President Nelson. It contained a recommendation for staggered terms of a three-man editorial board. It was moved by Mr. Stone, and seconded by Mr. Goddard, and unanimously adopted by the Council that the three-man editorial board for *Forest Science* consist of the executive secretary, *ex-officio*, and two other members to be appointed by the president for two-year terms, the terms to be staggered at the discretion of the president.

Upon motion of Dean Vaux, seconded by Mr. Heacox, the Council unanimously approved an advisory board of nine members to be appointed by the president, upon recommendation of the editorial board. Mr. F. H. Eyre, editorial assistant of *Forest Science* and part-time employee of the Society of American Foresters, reported that plans are underway to promote new subscriptions and increase income from reprints.

Committee on Natural Areas

John F. Shanklin, chairman of the Committee on Natural Areas, reported

(*Continued on page 64*)



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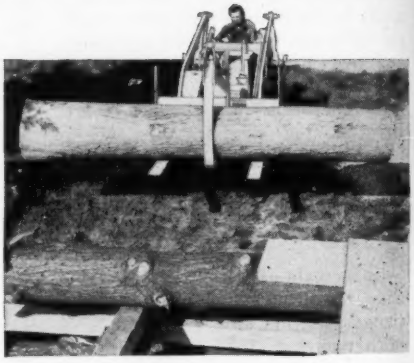

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that requests to two foundations to finance a proposed investigation to locate timberland containing those types which are presently missing from the approved natural area list, have been disapproved. (See Jour. Forestry, January 1957, p. 60.) The chairman said the committee would continue its efforts to interest a foundation in this investigation.

Membership

A general discussion of membership problems brought out the need for defining more clearly the basis of training and/or experience on which an Affiliate Member can be advanced to the grade of Junior. Should a candidate be advanced to the Junior grade, from Affiliate Membership, if he has had no forestry education? The consensus was that the Council Committee on Membership and Section membership committees should be provided with guidance in solving this problem.

Miscellaneous

Mr. Heacox informed the Council that the National Science Foundation is promoting a meeting on agricultural systemics. On motion of Mr. Heacox, seconded by Mr. Stone, the Council unanimously authorized the executive secretary to investigate and encourage at this meeting a discussion of forestry systemics.

Lloyd Thorpe, advertising representative for the JOURNAL OF FORESTRY, presented a report showing increase in advertising from about nine pages per issue in 1949 to eighteen pages per issue in 1957. The gross income from this source for the same period was $2,500-$33,000. In the general discussion which followed a suggestion was made that a committee might be appointed for reviewing the JOURNAL OF FORESTRY and building up, where possible, further interest in it; also that means be provided whereby the editor could travel more extensively to promote articles. The consensus was that no radical changes in the JOURNAL would be made before careful consideration.

Upon motion of Mr. Heacox, seconded by Dean Fontanna, the Council unanimously endorsed the actions of the Texas Forestry Association and the American Forestry Association in promoting the issuance of a commemorative three-cent postage stamp on the anniversary of Conservation and that such recognition should also include the Smokey Bear program.

Subsequent Council Meeting

At a Council meeting held on November 12th, the following members were present: President Nelson, Vice President Garratt, Mr. Briegleb, Mr. Coulter, Dr. Illick, Mr. Stone, and Dean Vaux, together with representatives of the New England Section.

The meeting was held to discuss the status of Chapter Associate members following the June 1957 Council meeting at which time Associate memberships of both Sections and Chapters were considered and acted upon. (See Jour. Forestry August 1957, pp. 605-606.)

The consensus of the Council members present was that Associate Chapter members in existence at this time should be continued in the same status as in the case of Associate Section members. This was not clearly brought out in the Council's June action. Therefore it was moved by Dean Garratt, seconded by Mr. Stone, and unanimously carried that it is the intent of the Council to provide for the inclusion of Associate Chapter membership for those who were Associate Members of the Chapters on or before the end of the calendar year 1957. This period of time is intended to permit the Chapters to adopt the revised by-law but does not suspend the stop order on the election of new Associate Chapter members by Council action of June 25, 1957.

Report of the Division of Forest Recreation

The annual meeting of the Division of Forest Recreation was held at the Onondaga Hotel, Syracuse, N. Y. on the evening of November 11, with 135 members and guests present. Chairman James P. Gilligan presided.

The following papers were presented:

1. "Plans and Problems of the U. S. Forest Operations Outdoors." Edward P. Cliff, Branch of National Forest Resource Management, U. S. Forest Service, Washington, D. C.
2. "Recreational Development in the Forest Preserves of New York." W. D. Mulholland, superintendent of camps and trails, New York State Conservation Department, Albany, N. Y.
3. "Recreation versus Forest Products in Land Use Planning." Frank W. Childs, National Park Service, Omaha, Nebr.

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4. "Natural Area Values." John F. Shanklin, Technical Review Staff, U. S. Department of Interior, Washington, D. C.

The following were elected officers for 1958:

Chairman, F. C. Koziol, U. S. Forest Service, Salt Lake City, Utah.

Vice-chairman, F. W. Childs, National Park Service, Omaha, Nebr.

Secretary, William A. Parr, director of parks, State of Maryland, Annapolis, Md.

F. W. CHILDS
Secretary

Report of the Division of Watershed Management

The seventh annual meeting of the Division of Watershed Management was held in the Syracuse Hotel, Syracuse, N. Y., on the evening of November 11 under the chairmanship of E. G. Dunford. Approximately 175 persons were in attendance indicating the continued and growing interest in watershed management. The following papers, which will be published in the *Proceedings* of the meeting, were presented at the technical session.

1. "Watershed Problems in New York State." H. G. Wilm, State University of New York College of Forestry, Syracuse, N. Y.

2. "Forest Watershed Problems and Opportunities in the Northeast." Norman R. Tripp and Howard Lull, Northeastern Forest Experiment Station, Upper Darby, Pa.

3. "Municipal Watershed Management in Practice." John M. Heilman, Division of Water Supply, Newark, N. J.

4. "Economic Research Needs in Watershed Management." G. R. Gregory, School of Natural Resources, University of Michigan, Ann Arbor, Mich.

The business meeting which followed the technical session was largely concerned with the method for election of Division officers. Guided by the report of the Committee on By-Laws consisting of Peter Fletcher, chairman, W. R. Boggess, Bernard Frank, and George Craddock, a motion was passed that: (1) The Watershed Management Division officers be advanced automatically, (2) The Division chairman appoint a nominating committee to select candidates for secretary, (3) The secretary be elected by ballot at the annual meeting of the Division.

It was moved and passed unanimously that the By-Laws Committee be dismissed with thanks and appreciation.

A secret ballot was conducted to fill the office of secretary for the following year. Candidates proposed by a nominating committee composed of Lewis Turner and William Cummings were George Craddock and Jack Rothacher. Jack Rothacher was elected secretary for 1958.

Members of the Division wish to express their appreciation to Chairman Dunford for his service during the past year.

SIDNEY WEITZMAN
Secretary

Report of the Division of Education

The 1957 meeting of the Division of Education was held on the evening of November 11th and was attended by approximately 200 members. David M. Smith presided.

Miss Martha Meelig, head librarian of the New York State University College of Forestry, presented a paper on the "Field Use of Libraries." She described the procedures by which foresters working in the field could avail themselves of greater and more effective use of the various forestry

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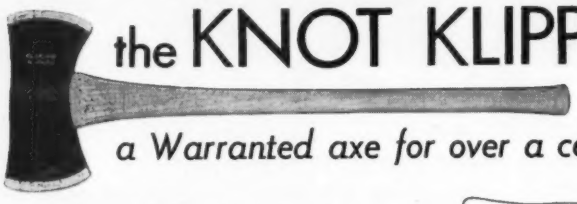

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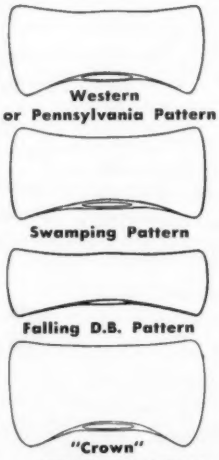

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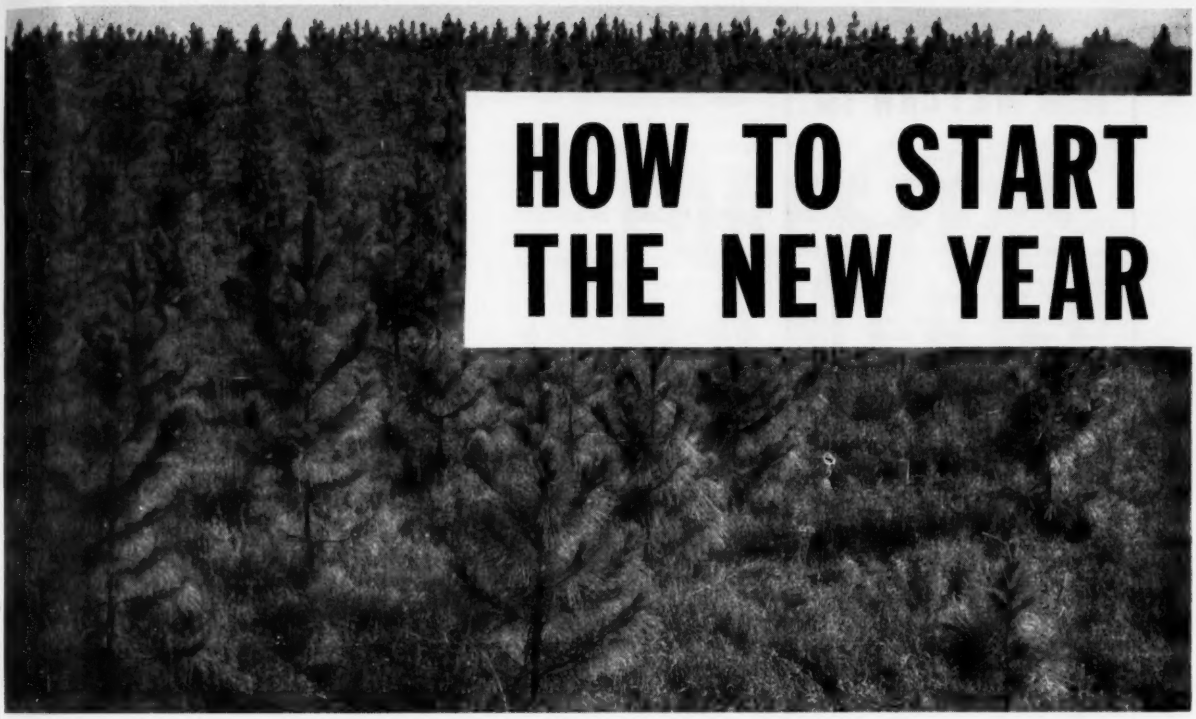

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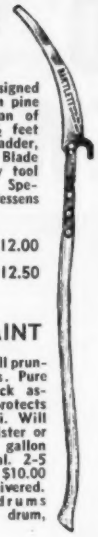

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libraries of universities and government agencies through inter-library loans. Both she and the various people who commented on her talk laid stress on the desirability of including training in the use of libraries as part of the education of forestry students.

Most of the meeting was devoted to a symposium on "Encouraging the Best Qualified Young Men to Enter Forestry." This program included the presentation of the report of the Society's Standing Committee on Career Counseling by Professor T. D. Stevens, committee chairman, published elsewhere in this issue.

Mr. Lynne M. Correll, director of personnel of the U. S. Forest Service, in a paper, "Foresters for Tomorrow," predicted a long-term increase in the need for foresters and advocated better salaries as one of the best means of filling the need. He urged that better use be made of the foresters now trained, especially by setting up more jobs for sub-professional technicians and then enlarging facilities for training them.

Professor Floyd E. Carlson of Syracuse discussed "The Public Relations Approach to Recruiting Forestry Students" and described the ways of establishing effective rapport with potentially interested high school students. He suggested that the forestry profession might well make common cause with other fields of science and technology in an effort to attract more men into these fields and improve science training in secondary schools.

In subsequent discussion it was brought out that high school science fairs represented an effective avenue for encouraging interest in forestry. Mr. Karl Swenning of the Scott Paper Company commented briefly but in detail on the committee recommendations. While he expressed general concurrence, he questioned certain of the recommendations. He indicated doubt about the efficacy of legal registration of foresters and stated that respect for the profession ultimately rested on the reputations established by individual foresters in their communities. He expressed the belief that too much emphasis was being placed on "selling" the profession as one of "service to society" and not enough on the rewards of the profession to the individual, especially those that exist for foresters capable of assuming positions of high executive responsibility.

Other discussion reflected general concurrence with the main features of the committee report and it was voted that it be commended to the attention of the Council and the profession at large.

The following slate of officers was elected:

Chairman, Professor A. Bigler Crow, School of Forestry, Louisiana State University, Baton Rouge.

Vice-chairman, Professor Peter W. Fletcher, School of Forestry, University of Missouri, Columbia.

Secretary, Professor William C. Bramble, School of Forestry, Pennsylvania State University, University Park.

DAVID M. SMITH
Chairman

Report of the Division of Silviculture

The regular annual meeting of the Division of Silviculture was held at the Syracuse Hotel, Syracuse, N.Y. on November 12, 1957. Henry I. Baldwin, chairman of the Division, presided. Approximately 220 persons were in attendance. The following papers were presented:

1. "Oak Wilt: Its Significance, Spread, and Prevention." A. J. Riker, Department of Plant Pathology, University of Wisconsin, Madison, Wis.

2. "Possibility of Developing Strains of White Pine Resistant to the White Pine Weevil." William J. Gabriel, Northeastern Forest Experiment Station, Burlington, Vt.

3. "Height Growth of 81 Progenies of Ponderosa Pine." R. Z. Callaham and A. A. Hasel, California Forest and Range Experiment Station, Berkeley, Calif.

4. "Detection and Characteristics of Triploid Quaking Aspen in Nature." J. P. van Buijtenen, Dean W. Einspahr, and Philip N. Joranson, Institute of Paper Chemistry, Appleton, Wis.

5. "Shallow Soils Hardpans, and Root Penetration in the Spruce-Fir-Hardwood Forest of Northern New England." T. F. McLintock, Southeastern Forest Experiment Station, Lake City, Fla.

6. "Variation in Development of Low Plant Cover Following Chemical Brush Control." W. C. Bramble, W. R. Byrnes, and D. P. Worley, School of Forestry, Pennsylvania State University, University Park, Pa.

7. "Sand Pine Regeneration on the Ocala National Forest." Robert W.

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Cooper, Southeastern Forest Experiment Station, Lake City, Fla.

8. "Ecology of White Pine Silviculture in Central Ontario." David R. M. Scott, College of Forestry, University of Washington, Seattle, Wash.

9. "Wind-Caused Mortality in Minnesota Black Spruce in Relation to Cutting Methods and Stand Conditions." M. L. Heinselman, Lake States Forest Experiment Station, Grand Rapids, Minn.

10. "Effect of Storage Conditions on the Viability of Rocky Mountain Tree Pollens." Gilbert H. Fechner, College of Forestry and Range Management, Colorado State University, Fort Collins, Colo.

In addition there was a panel discussion under the topic: "The Place of Tree Improvement in Forest Pest Control," moderated by Professor Harold J. Lutz, School of Forestry, Yale University, New Haven, Conn. Covered under the discussion were the following:

"The Possibilities and Limitations of Breeding for Pest Resistance in Forest Trees." Ernst J. Schreiner, Division of Forest Genetics, Northeastern Forest Experiment Station, Upper Darby, Pa.

"The Outlook for Breeding Trees Resistant to Insects." James A. Beal, Division of Forest Insect Research, U. S. Forest Service, Washington, D. C.

"Limitations of Tree Breeding and Selection in the Control of Disease." John S. Boyce, Osborn Botanical Laboratory, Yale University, New Haven, Conn.

"A Silviculturist's Viewpoint." George S. Meagher, Pacific Northwest Forest and Range Experiment Station, Portland, Ore.

Reports were presented by the Committee on Tree Improvement and the Committee on Natural Areas. These are printed below.

The new officers for 1958 are:

Chairman, James D. Curtis, Intermountain Forest and Range Experiment Station, Ogden, Utah.

Vice-chairman, William H. Cummings, Forest Research Center, Weyerhaeuser Timber Company, Centralia, Wash.

Secretary, Richard D. Rosenberry, chief forester, The Diamond Match Co., Chico, Calif.

E. H. TRYON
Secretary

Report of the Committee on Forest Tree Improvement

The first formal meeting of the Committee on Forest Tree Improvement was held in conjunction with the annual meeting of the Society in Milwaukee, Wis. October 25, 1954. The Committee has met regularly once in each succeeding year.

Among the objectives originally outlined for the Committee, particular consideration has been given to the encouragement of research in forest genetics and the promotion of the application of genetic principles in silviculture. In lieu of direct action, the decision was made to confine the Committee's efforts to activities that might facilitate the exchange of information between individuals and institutions and by similar subtle methods aid in the attainment of the above objectives.

In accord with this policy, preparation of a *Directory of Forest Genetics Research in the United States and Canada* was undertaken by Jonathan W. Wright and published in 1955. The Directory has received wide distribution and has proved of great usefulness to workers in the field of tree im-

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provement and associated disciplines. A new edition of the Directory, now in preparation, will be published in the spring 1958.

Under auspices of the Committee, Jonathan Wright also assumed responsibility for the publication of an annual *Bibliography of Forest Genetic Research*. Two numbers of the Bibliography, covering material published in 1954 and 1955, have been published and distributed. The third number of this publication, covering the literature for the years 1956 and 1957, will be published and distributed in early 1958.

In 1955 the Committee undertook preparation of a *Glossary of Genetic Terms* designed specifically for the use of foresters. Initial collation and editing was conducted under the leadership of Bruce Zobel and later Stephen N. Wyckoff. The version now in preparation is being edited by E. Bayne Snyder and will be in form for final review in autumn 1958. A portion of the Glossary definitions was contrbuted in December 1956 to the editors of the current edition of *Forestry Terminology*.

In conjunction with the Society's 1957 meeting in Syracuse, the Committee arranged for a special meeting of workers in tree improvement the evening of November 11. The primary purpose of the meeting was to discuss problems associated with botanical and cultivated plant nomenclature. Elbert L. Little, Jr., dendrologist, U. S. Forest Service, submitted several recommendations for the naming of hybrids and varieties of forest trees that would contribute to increased uniformity of nomenclature among research workers in tree improvement. A discussion and report on the recommendations presented will be published in the near future.

R. T. BINGHAM E. B. SNYDER
J. W. DUFFIELD J. W. WRIGHT
F. I. RIGHTER B. ZOBEL
S. S. PAULEY, *Chairman*

1957 Progress Report of Committee on Natural Areas

The Committee on Natural Areas is pleased to report substantial progress during the past 12 months.

Two natural areas were approved by the Committee during the year.

Both of these areas are on the Kenai Peninsula in Alaska and are administered by the Bureau of Sport Fisheries and Wildlife. One, the Nikolai Bay Natural Area, approximately 100 acres in size, protects the black spruce type. The other, the Bedlum Lake Natural Area, protects the white spruce-birch type (SAF Type No. 202). It will be at least 20 acres when the boundaries are finally delineated.

The National Park Service has proceeded since our report of a year ago to process the necessary reports relating to the establishment of natural areas within the National Park System. From advance but incomplete reports it appears that 22 natural areas have already been set up for consideration. These areas include about 14 forest types.

Action was taken during the year to prepare proposed standards for the administration of natural areas. These standards, which are for the guidance of administering officials, are presently before the Section liaison officers for review and comment. Comments received thus far indicate general agreement with the proposed standards. A copy of these standards is made a part of this progress report. After consideration of all comments which may be received from the Section liaison officers, the Committee on Natural Areas will publish the modified standards for the benefit of all concerned with administration of natural areas.

RICHARD GRIFFITH
IVAN H. SIMS
JOHN F. SHANKLIN, *Chairman*

Proposed Criteria For Management of Natural Areas

A natural area must be protected against encroachments and actions which in themselves or indirectly would modify existing conditions and influence changes, if such area is to be of value for observation and research on forest and plant succession, plant associations, habitat requirements of species, insect and fungus depredations, soil microbiology, phenology, and related phenomena. The criteria for management of natural areas are guide lines for protection against encroachments. When in doubt what to do, leave the area alone.

Identification.—The natural area should be identified in the administrative records as to purpose and objectives, and the boundary corners marked for the convenience of management and research personnel. Signs which would tend to attract sightseers, recreational and casual visitors should be avoided; however, if the roads or trails pass along the boundary or through the natural area, limited posting may be needed to minimize encroachments.

Fences.—Natural area boundaries need not be fenced unless necessary for protection against domestic livestock.

Publicity.—Publicity through professional sources at national, regional, state, university, or local levels to apprise professional research workers such as foresters, ecologists, botanists, silviculturists, etc., as to the location, forest type, and administering agency, is essential in the interest of making proper use of the natural areas. Publicity other than the foregoing should be avoided.

Physical improvements.—Generally speaking, no physical improvements such as roads, trails, fences, or buildings, except minor structures required to house or protect instruments or tools

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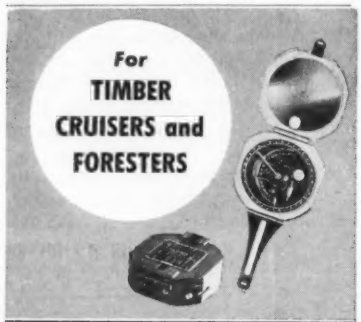
used by specific research projects, should be permitted within a natural area. Except as essential to fire protection of adjoining lands, no buildings, roads, or trails should be permitted at or on the boundaries of a natural area.

Existing roads needed for administrative purposes, including the management of contiguous lands, or to facilitate research, and which do not impair the function of a natural area, may be maintained; however, such maintenance, including the removal of dead and down timber should be limited to a strip not exceeding 30 feet either side of the center line of such roads.



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Public use.—Picnicking, camping, berry, nut, or herb gathering, plant collecting, and other public uses which would contribute to modification of a natural area, impair or limit the value of a natural area for research purposes, should be discouraged or expressly prohibited if such uses represent a serious threat of encroachment. Generally fishing can be permitted; however, the prohibition of hunting and trapping may be necessary if the removal of game and furbearers is likely to be on a scale sufficient to affect the biotic communities.

Protection.—All wild fires originating within or adjacent to a natural area should be brought under control as quickly as possible. If a fire burns within a natural area no cleanup or fire hazard reduction should be undertaken, nor reforestation undertaken, unless the utility of such area has been seriously impaired and it is to be dropped from the natural area classification.

No control of insects or disease should be instituted unless it is conclusively demonstrated by recognized entomologists or pathologists that the infestation or infection represents a distinct threat to adjacent forests, either from a strictly commercial, aesthetic, or recreational viewpoint. Insect or disease-killed trees are a part of the natural forest and should not be disturbed on a natural area, except as a specific research project may so require.

Bird and mammal populations will not be subject to control, other than normal removal through public hunting, except as a specific research project may so require.

Report of the Division of Private Forestry

The Division of Private Forestry held its annual meeting at the Onondaga Hotel on November 12, 1957. Secretary George Abel presided. In attendance were some 210 persons. The following papers were presented:

1. "Terminating Federal Supervision over Indian Forests." Kenneth B. Pomeroy, American Forestry Association, Washington, D. C.

2. "Fifty Years of Industrial Forestry with the Empire State Forest Products Association." Nelson C. Brown, Syracuse, N.Y., and A. B. Recknagel, Ithaca, N. Y.

3. "Significance of Price Reporting in Forestry." A. C. Shaw, Champion Paper and Fibre Company, Hamilton, Ohio.

4. Panel Discussion: "Forest Management by Private Foresters in the Northeast."

Moderator, William P. House, consulting forester, Chesham, N. H.; Robert Moore, consulting forester, Danville, Pa.; James D. Pond, Pond and Moyer Company, Ithaca, N.Y.

This was the final meeting of the Division as it is to be abolished and in the future merged with appropriate other Divisions. Council member E. F. Heacox reviewed reasons for termination. There was no business session.

GEORGE ABEL
Secretary

Report of the Division of Forest-Wildlife Management

The Division of Forest-Wildlife Management held its annual meeting in the Onondaga Hotel at Syracuse, N. Y. on November 12. Secretary Odell Julander presided over the technical session and Vice-chairman Elbert H. Reid over the business meeting. Attendance was approximately 140. Papers presented were as follows:

1. "Trends in Wild Turkey Population in the Missouri Ozarks." John B. Lewis, Missouri Conservation Commission, Columbia, Mo.

PROCEEDINGS

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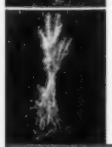

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2. "Future Role of State Conservation Departments in Forest-Wildlife Management." Frank B. Barick, Game Division, North Carolina Wildlife Resources Commission, Raleigh, N. C. (Paper read by A. S. Taormina.)

3. "Future Role of Federal Agencies in Forest-Wildlife Management." Clarence Cottam, Rob and Bessie Welder Wildlife Foundation, Sinton, Tex.

4. "Future of Forest-Wildlife Management in the Plans of Woodland Owners." Arthur L. Bennett, Department of Woodlands Operations, Armstrong Forest Company, Johnsonburg, Pa.

5. "Will There be a Transition from Free Public Hunting to Paid Shooting?" Edward L. Kozicky, Conservation Department, Olin Mathieson Chemical Corporation, East Alton, Ill.

Vice-chairman Reid suggested that some form of liason or activity between the Forest-Wildlife Division, SAF, and the North American Wildlife Conference might be desirable. Several members spoke in favor of this. Edward Cliff, assistant chief, U. S. Forest Service, moved that the officers of the Division contact the officials of the North American Wildlife Conference and investigate the possibility of the Wildlife Division of the Society of American Foresters sponsoring a session on forest-wildlife habitat management at the 1959 and subsequent conferences. The motion was carried.

ODELL JULANDER
Secretary

Report of the Division of Forest Products

The Division of Forest Products held its annual meeting on November 12, 1957 at the Onondaga Hotel, Syracuse, N. Y., Chairman Stephen B. Preston, presiding. About 140 persons were present. Papers presented were:

1. "Changes in the Wood-Using Industry Accompanying Changes in Forest Resources." Raymond J. Hoyle, College of Forestry, State University of New York, Syracuse, N. Y.

2. "Quality of Lumber which is not Measured by Grade." James S. Bethel, School of Forestry, North Carolina State College, Raleigh, N. C.

3. "Suitability of Eastern White Pine and Red Pine for Veneer and Plywood." John F. Lutz, Forest Products Laboratory, Madison, Wis.

4. "The Use of Bolter Saws in Conversion of Small Hardwood Logs." Richard M. Pieree, Forster Manufacturing Company, Farmington, Maine.

5. "The Reaggregated Wood Products Industry and What it Means to Intermediate and Salvage Cuttings." Paul J. Bois, Southeastern Forest Experiment Station, Asheville, N. C. and Arthur H. Haigh, Jr., Morgan Manufacturing Company, Black Mountain, N. C.

6. "Factors Contributing to the Increased Utilization of West Coast Hardwoods." Fred E. Dickinson, California Forest Products Laboratory, Richmond, Calif.

A short business session was held to prepare plans for a meeting and program to be held in Salt Lake City, Utah next fall. The preparation of the program was placed in the hands of the following elected officers.

Chairman, Harry E. Troxell, School of Forestry and Range Management, Colorado State University, Fort Collins, Colo.

Vice-chairman, Bernard M. Granum, Iron Range Resources and Rehabilitation, Court House, Hibbing, Minn.

Secretary, Rudolph Grah, School of Forestry, University of California, Berkeley 4, Calif.

BERNARD M. GRANUM
Secretary

Report of the Division of Forest Economics and Policy

The annual meeting of the Division of Forest Economics and Policy was held at the Onondaga Hotel, Syracuse, N. Y. on November 12, 1957. Chairman Carl H. Stoltenberg presided. About 200 persons were in attendance. The following technical papers and formal comments were presented.

1. "Forest Taxation Problems: How Serious and for Whom?" William A. Duerr, College of Forestry, State University of New York, Syracuse, N. Y.

Comments:

George B. Amidon, Minnesota and Ontario Paper Company, International Falls, Minn.

Paul M. Dunn, St. Regis Paper Company, New York, N. Y.

Paul F. Liniger, Industrial Forestry Association, Portland, Ore.

2. "What Can Be Accomplished."

"By Improving the Property Tax: Some Promising Developments." Ellis T. Williams, Division of Forest Economics Research, U. S. Forest Service, Washington, D. C.

"By Special Forest Tax Laws: Lessons from New Hampshire." William P. House, consulting forester, Chesham, N. H.

Comments:

W. D. Hagenstein, Industrial Forestry Association, Portland, Ore.

E. S. Hurd, Consolidated Water Power and Paper Company, Rhinelander, Wis.

James H. Kitchens, Jr., Louisiana Forestry Association, Alexandria, La.

The chairman outlined the problems of operating the Division caused by the fact that the present officers and Executive Committee members serve such short terms. After discussion the following motion was adopted: The Executive Committee shall consist of the chairman, vice-chairman, secretary, retiring chairman, and three appointed members. Each year at the annual

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meeting a secretary and vice-chairman shall be elected—the secretary for a one-year term, the vice-chairman for a three-year term during which he will serve successively as vice-chairman, chairman, and retired-chairman-member of the Executive Committee. The appointed members of the committee shall serve three-year terms, staggered so that one new man is appointed each year.

In the light of these new arrangements a motion was passed that the present standing committees be thanked for their excellent service and disbanded, and that in the future, the chairman be authorized to appoint *ad hoc* committees to study those specific problems that he and the Executive Committee believe desirable.

The report of the Committee on Research was received. This asked the advice of the meeting on a resurvey of activity in the field of forest economics research. After considerable discussion a motion was passed that as a first step in a survey of activity in the field of forest economics, the chairman might make up an *ad hoc* committee to compile a directory of workers in the field and their special areas of work and interest.

The following were elected officers for 1958:

Chairman, S. Blair Hutchison.
Vice-chairman, John A. Zivnuska.
Secretary, Robert Keniston.

It was moved and passed that for next year's technical meeting the Executive Committee prepare a statement to clarify the distinction between a forest "yield" and a forest "severance" tax. This statement should not only clarify the terminology of these taxes but should also present a rationale for distinguishing each.

The chairman discussed the action taken by the Executive Committee to discharge its responsibility as set forth in a motion concerning the name of the Division, made at the last Annual Meeting. A motion was made to approve this action that: (1) the Division retain its present name. (2) The Divisional Committee be requested to select papers that deal with analyses of the economic aspects of forest problems. These analyses will generally be relevant to policy decisions. (3) Although the Division does not claim sole, or even primary, responsibility for policy discussions at Society meetings, it is felt that emphasis on the economic aspects of such decisions will help to clarify many issues. (4) The Division acknowledges responsibility for stimulating interest and developing improved economic analyses for all policy issues in which these tools of analysis are helpful. This responsibility will be reflected in our meeting programs and in our committee assignments. After considerable discussion the motion was not approved and no further directive for action was given the Executive Committee.

ERNEST M. GOULD, JR.
Secretary

Report of the Division of Range Management
(Joint Meeting with the Division of Forest-Wildlife Management)

Under the topic "Game Range Habitat Management" a joint meeting was held with the Division of Forest-Wildlife Management on November 13, 1957 in the Onondaga Hotel, Syracuse, N.Y. Elbert H. Reid, chairman of the Division, presided. About 130 persons were present. The following papers were read:

1. "Effect of Pulpwood Cutting Practices on Deer." John D. Gill, Game Division, Maine Department of Inland Fisheries and Game, University of Maine, Orono, Maine.

2. "The Effect of Hardwood Removal on Wildlife." Vincent H. Reid and Phil D. Goodrum, Fort Collins, Colo. and U. S. Fish and Wildlife Service, Nacogdoches, Tex., respectively.

3. "Differences in Range Vegetation Resulting from Grazing by Deer, Cattle, and Sheep." L. E. Riordan, Colorado Game and Fish Department, Denver, Colo.

4. "The Use of Fire in California Chaparral for Game Habitat Improvement." H. H. Biswell, School of Forestry, University of California, Berkeley, Calif.

5. "The Relation of Forage Production to Silvicultural Thinning of Ponderosa Pine in the Black Hills of South Dakota." Richard M. Hurd and Charles P. Pase, Rocky Mountain Forest and Range Experiment Station, Rapid City, S. Dak.

No business meeting was held.

ELBERT H. REID
Chairman

Report of the Division of Forest Management

The annual meeting of the Division of Forest Management was held on November 13 in the Syracuse Hotel, Syracuse, N. Y. Chairman Gerald S.

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Wheeler presided over the session which was attended by about 250 persons. The following papers were presented:

1. "Cover Mapping Massachusetts from Aerial Photographs." William P. MacConnell, Department of Forestry and Wildlife Management, University of Massachusetts, Amherst, Mass.
2. "A Trial Run in Continuous Forest Inventory in Canada." R. G. Belcher, Canadian International Paper Company, Montreal, P. Q., Canada.
3. "Pulpwood Procurement in a Metropolitan Region." Stanley W. Hamilton, West Virginia Pulp and Paper Company, Mechanicville, N. Y.
4. "Adapting the Management of a Large Tract of Private Timberland to Industrial Needs." Dwight B. Demeritt, Dead River Company, Bangor, Maine.
5. "Pilot Woodland Management Program in New Hampshire." Kenneth E. Barraclough, Extension Service, University of New Hampshire, Durham, N. H.
6. "Air Attack on Forest Fires." M. M. Nelson, Division of Fire Control, U. S. Forest Service, San Francisco, Calif.
7. "Growing Importance of Hardwoods to the Paper Industry in the Northeast." Gerald A. Pesez, International Paper Company, Glens Falls, N. Y.

An additional paper, "Some Problems of Tropical Forest Management," by Sir Herbert Howard, Commonwealth Agricultural Bureaux, Farnham Royal, Bucks, England submitted for the occasion was not read because of the absence of the author due to illness. However, it is recommended that the paper be published in the *Proceedings* of the meeting.

The following were elected officers for 1958:

Chairman, Walter F. McCulloch, dean, School of Forestry, Oregon State College, Corvallis, Ore.

Vice-chairman, Russell K. LeBarron, forest management research, California Forest and Range Experiment Station, Berkeley, Calif.

Secretary, Raymond R. Moore, associate professor, forest management, Utah State University, Logan, Utah.

Mr. Recknagel called attention to the fact that the Division of Private Forestry had been discontinued, and wished to recommend, for the record, that the Division of Forest Management take this into consideration with respect to giving private forest management adequate treatment in future programs of the Division.

E. W. LITTLEFIELD
Secretary

Columbia River Section Forms Committee on Chemical Use

Columbia River Section has organized a new herbacide committee to collect and disseminate information on the use of chemicals to control weeds, grass, and brush on forest land. Through the committee the Section hopes to keep abreast of the rapid advancements in the development of chemicals for use in forest management.

Carl M. Berntsen, Willamette Research Center, has been appointed chairman of the committee. Assisting him will be R. C. Campbell, Bureau of Land Management, Salem; James Krygier, School of Forestry, Oregon State College; and W. F. Penney, Sweet Home, Ore.

Additions Sought for Technical Assistance Roster

There appeared in the July 1956 issue of the JOURNAL OF FORESTRY (p. 480) a notice of "Opportunities in Foreign Forestry Employment" and of starting a roster in Society headquarters of members interested in foreign assignments.

The response to this notice was smaller than anticipated; therefore, this follow-up notice. Although the total number of U. S. foresters on assignment with ICA and FAO, the two principal employers, is still under forty, recruitment for the few new openings developing each year is proving difficult and time-consuming. We believe an important part of this difficulty is due to lack of information about the opportunities afforded by these openings rather than to lack of willingness on the part of qualified candidates to be considered for foreign assignments.

Members of the Society who are interested in foreign work are referred for details of the conditions of employment to the article mentioned above; there having been no essential changes in this respect since the earlier writing. It should be emphasized again that what demand there is, is for "experts," and that foresters with less than ten years of professional experience will not ordinarily find it worthwhile to have their names placed on the roster. It will also bear repeating that the roster is maintained as a purely voluntary means of cooperating with agencies engaged in foreign operations which require the services of foresters and seeking the Society's help in locating suitable candidates.

There are no forms to be filled out. If you are interested in having your name placed on the roster, simply write to Technical Assistance Roster, in care of the Society, and include the kind of information on your professional training and experience customarily needed in making a preliminary selection of candidates qualified for a particular position.

V. L. HARPER, *Chairman,*
Committee on International Relations

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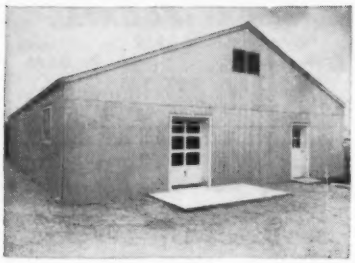

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Membership Applications and Advancements

Proposals for admission, advancement, and reinstatements received in the Society office during the month of November are listed below.

Action on the eligibility of those proposed for membership as listed below will be taken by the Council as of February 1958. Communications from voting members regarding the membership eligibility of these persons should be received in the Society office prior to that date.

Allegheny Section

Student Grade

PENNSYLVANIA STATE UNIVERSITY

Pasquerella, M. J. Schall, R. L.

WEST VIRGINIA UNIVERSITY

Arbogast, K. A. O'Dell, A. W.
Fromhart, F. W. Pfanstiel, J. F.
McDaniel, J. R. Walker, L. O.
Goughnour, C. A. Winters, R. C.
McManigle, M. L. Yokum, H. J.

Appalachian Section

Student Grade

DUKE UNIVERSITY

Flora, R. L.

Junior Grade

Douglas, F. L., Forester, W. Va. Pulp & Paper Co., Summerville, S. C. (Reinstatement).

Nagel, W. P., Forest Entom., USFS, Asheville, N. C.; State Univ. of N. Y., B.S.F., 1953, M.S. Forest Entom., 1957.

Member Grade

Sorensen, C. S. K., Cruiser, Piedmont Forest Farms, Anderson, S. C.; Univ. of Fla., B.S.F., 1951. (Junior 1951).

Affiliate Grade

Ingram, E. L., Forest Tech., West Va. Pulp & Paper Co., Summerville, S. C.

McClary, J. E., Forester, W. Va. Pulp & Paper Co., Winnsboro, S. C.

Robinson, J. F., Forest Tech., International Paper Co., Wilmington, N. C.

Central Rocky Mountain Section

Student Grade

COLORADO STATE UNIVERSITY

Carr, V. L.

Member Grade

Metcalf, W. B., Dist. Ranger, USFS, Sundance, Wyo.; Univ. of Mo., B.S.F., 1949. (Junior 1951).

Tiedmann, H., Forest Supv., USFS, Golden, Colorado. (Reinstatement).

Central States Section

Student Grade

PURDUE UNIVERSITY

Bastian, R. W. Hughes, A. O.
Born, J. D. Oswalt, E. K.
Browder, R. B. Reed, P. T.
Crozier, G. H. Schuckel, W. L.
Gee, S. R. Shaw, D. L.
Haubry, N. F. Simmers, U. J.
Henley, R. J. Tryon, C. P.
Watt, R. D.

Columbia River Section

Student Grade

OREGON STATE COLLEGE

Barringer, J. D. Brown, E. H.

Junior Grade

Bradley, R. F., Co. Ext. Agent, Ore. State College, Roseburg, Ore. (Reinstatement).

Member Grade

Carmichael, R. L., Asst. Research Forester, Weyerhaeuser Research Center, Centralia, Wash.; Univ. of Idaho, B.S.F., 1951. (Junior 1951).

Paisley, E. R., Albany, Ore. (Junior 1950).

Riddle, D. D., Forester, BLM, Salem, Ore.; Iowa State, B.S.F., 1950. (Junior 1951).

Affiliate Grade

Harter, L. R., Cons. Supv., Ore. Dept. of Forestry, Salem, Ore.

Gulf States Section

Student Grade

LOUISIANA POLYTECHNIC INSTITUTE

Murphy, J. W. Smith, W. T.
Zeagler, J. H.

LOUISIANA STATE UNIVERSITY

Folsom, J. R.

Member Grade

Groepper, R. C., Unit Forester, International Paper Co., Carthage, Texas; Univ. of Mo., B.S.F., 1952. (Junior 1953).

Hawk, H. E., Chief Forester, U. S. Gypsum Co., Greenville, Miss.; Iowa State, B.S.F., 1952. (Junior 1952).

Taylor, L. S., Dist. Forester, Kirby Lbr. Corp., Silsbee, Texas; Univ. of Maine, B.S.F., 1951. (Junior 1951).

Affiliate Grade

Burchfield, K. P., Asst. Dist. Forester, Miss. Forestry Comm., Wiggins, Miss.

Inland Empire Section

Student Grade

UNIVERSITY OF IDAHO

Amos, A. J.

Intermountain Section

Student Grade

UTAH STATE UNIVERSITY

Binando, J. Keetch, M. R.
Cloward, P. V. Kline, L. N.
Cochrane, J. W. Lillie, R. M.
Daehler, R. E. Pangman, H. G.
Emden, A. C. Prince, J. M.
Fene, K. M. St. Andre, G. J.
Gee, J. R. Sorrell, D. I.
Glenn, J. R. Vaughn, D. E.
Hopson, T. D. Walker, P. J.
Jackson, N. R. Wirth, A. W.

New England Section

Student Grade

UNIVERSITY OF MAINE

Czapowskyj, M. M. Lerandeau, H. C.
Hobson, J. C. Murphy, J. D.
Jaques, G. E. Rast, G. F.
Wetzel, L. K.

YALE UNIVERSITY

Kurmes, E. A.

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Junior Grade

Dowdle, B., Candidate for MF, Yale School of Forestry, New Haven, Conn. Univ. of Wash., B.S.F., 1957.

New York Section

Student Grade

STATE UNIVERSITY OF NEW YORK

White, D. E.

Junior Grade

Decker, H. V., Forester, N. Y. State Cons. Dept., Cortland, N. Y.; State Univ. of N. Y., B.S.F., 1953, M.S.F. 1956.

Dickerson, M. E., Forester, Ward Lbr. Co., Jay, N. Y.; Pa. State, B.S.F., 1953.

Member Grade

Andrews, J. R. T., Forester, Hunting Tech. & Exploration Services, Ltd., Toronto, Canada; Yale Univ., M.F., 1953. (Junior 1953).

Affiliate Grade

Fuchs, O., Tester, Paper Lab., International Paper Co., Palmer, N. Y.

Northern California Section

Member Grade

Albertus, C. G., Monterey, Calif. (Junior 48R55).

Backlund, A. J., Arcata, Calif. (Junior 48R55).

Barnickol, H. J., Placerville, Calif. (Junior 1950).

Berridge, R. D., Asst. Resident Forester, Diamond Match Co., Paynes Creek, Calif.; Univ. of Calif., B.S.F., 1952. (Junior 1952).

Casad, B. C., Alturas, Calif. (Junior 1950).

Chatten, L. R., North Sacramento, Calif. (Junior 1950).

Dehls, R. B., Summerville, S. C. (Junior 1950).

Fair, J. D., Redding, Calif. (Junior 1950).

Graham, W. C., Arcata, Calif. (Junior 1950).

Hanchett, W. C., Fortuna, Calif. (Junior 1950).

Johnson, D. S., Susanville, Calif. (Junior 1950).

Jones, W. V., Dist. Ranger, USFS, Stonyford, Calif.; Ore. State, B.S.F., 1951. (Junior 1951).

Kirchner, W., Mariposa, Calif. (Junior 1950).

Knight, M. J., Klamath, Calif. (Junior 1950).

Krohn, R. F., Forest Eng., Fibreboard Paper Products Corp., San Francisco, Calif.; Yale Univ., M.F., 1954. (Junior 1953).

Langley, P. G., Orinda, Calif. (Junior 1950).

Leisz, D. R., Dist. Ranger, USFS, Salyer, Calif.; Univ. of Calif., B.S.F., 1950. (Junior 1953).

Levine, J., Arcata, Calif. (Junior 1950).

Mace, R. B., Tbr. Mgmt. Asst., USFS, Greenville, Calif.; Univ. of Calif., B.S.F., 1953. (Junior 1953).

McBride, R. S., San Diego, Calif. (Junior 1950).

Millar, R. R., Miramonte, Calif. (Junior 1950).

Miller, H., Mill Valley, Calif. (Junior 1950).

Niles, J. R., Placerville, Calif. (Junior 1950).
Settle, W. H., Sawyer's Bar, Calif. (Junior 1950).
Springer, J. C., Forest Tech., Calif. Div. of Forestry, Riverside, Calif.; Univ. of Calif., B.S.F., 1951. (Junior 1951).
Storms, G., Porterville, Calif. (Junior 1950).
Taylor, G. W., Nevada City, Calif. (Junior 1950).
Winters, W., Sacramento, Calif. (Junior 1950).

Northern Rocky Mountain Section

Junior Grade

Hamor, C. K., Forester, J. Neils Lbr. Co., Libby, Mont. (Affiliate 1956).
Neils, R. L., Asst. Logging Supt., J. Neils Lbr. Co., Libby, Mont. (Affiliate 1955).
Russell, R. M., Logging Supt., J. Neils Lbr. Co., Libby, Mont. (Affiliate 1956).
Schokneeht, M. J., Logging Mgr., J. Neils Lbr. Co., Libby, Mont. (Affiliate 1956).

Member Grade

Driver, W. R., Forester, USFS, Bozeman, Mont.; Univ. of Idaho, B.S.F., 1951. (Junior 1951).
Welton, E. M., Livingston, Mont. (Reinstatement).

Ozark Section

Student Grade

UNIVERSITY OF MISSOURI

Ashton, A. W.	Schuhmann, M. H.
Cornish, G. R.	Smith, L. M.
Dietzel, W. D.	Turley, D. G.

Affiliate Grade

Rowell, W. R., Forester, International Paper Co., Sheridan, Ark.
Sherrer, W. L., Forester, USFS, Mt. Ida, Ark.
Steelman, A. K., Forest Ranger, USFS, Potosi, Mo.

Puget Sound Section

Student Grade

UNIVERSITY OF WASHINTON

Atterbury, T.	Matthews, R. P.
Bryant, R. L.	Saasen, A. L.
Lustie, A. C.	Scott, N. R.

Wolf, J. M.

Affiliate Grade

Mansfield, J. W., Forest Warden, State Div. of Forestry, Beaver, Wash.
Smith, D. S., Forester, Ketchikan Pulp Co., Ketchikan, Alaska.

Southeastern Section

Student Grade

UNIVERSITY OF FLORIDA

Andrews, D. E.	Jones, A. W.
Austin, D. H.	Jones, T. S.
Coleman, M. C.	Leonard, B. H.
Gibbs, J. M.	Shealy, G. N.
Godfrey, C. W.	Tolotti, C. W.

William, H. R.

UNIVERSITY OF GEORGIA

Brewer, J. C.	Marsh, J. D.
Brooks, T. L.	Miles, B. P.
Catlett, J. A.	Moss, W. T.
Chesser, G. S.	Mosteller, R. E.
Everett, C. H.	O'Hagan, J. L.
Garrison, J. C.	Rigdon, S. T.
Griner, R. D.	Skipper, H. A.
Johnson, A. S.	Smith, T. A.
Johnson, W. L.	Smith, W. C.
Jones, R. T.	Taylor, B. J.
Liles, J. P.	Vinson, M. S.
Long, J. G.	Warren, B. J.
Lunsford, J. D.	Williams, C. R.

Williams, R. F.

Junior Grade

Baylor, C. N., Forest Tech., International Paper Co., Richmond Hill, Ga.; W. Va. Univ., B.S.F., 1951.
Brinson, J. L., Resident Mgr., Woodlands Div., Owens-Illinois Glass Co., Hawthorne, Fla.; Univ. of Fla., B.S.F., 1949.
Thompson, L. O., Forest Tech., International Paper Co., LaGrange, Ga. (Reinstatement).

Member Grade

Baxter, H. O., Marketing Spec., Ga. Agricultural Ext. Service, Athens, Ga.; Univ. of Ga., B.S.F., 1950, M.F., Forest Mgmt., 1951. (Junior 1951).

Upper-Mississippi Valley Section

Student Grade

IOWA STATE COLLEGE

Anderson, D. P.	Brown, G. N.
Binger, C. E.	Hillman, K. W.
Brown, D. B.	Spolar, T. J.

Affiliate Grade

Peura, R. C., Asst. Area Forester, Minn. Forest Service, Hill City, Minn.

Washington Section

Affiliate Grade

Gaufin, D. M., Asst. Dir. Wildlife Mgmt., USFS, Washington, D. C.

Wisconsin-Michigan Section

Student Grade

MICHIGAN COLLEGE OF MINING AND TECHNOLOGY

Moore, J. T. Olson, A. G.
Vogel, T. C.

UNIVERSITY OF MICHIGAN

Seidel, K. W. Whaley, R. S.

Junior Grade

Bolz, R. C., Asst. Dist. Forester, Mich. Dept. of Cons., Ishpeming, Mich.; Univ. of Mich., B.S.F., 1950.
Carter, K. B., Forestry Asst., Consumers Power Co., Jackson, Mich.; Univ. of Mich., B.S.F., 1948.
Roach, R. V., Asst. Dist. Forester, Wis. Cons. Dept., Viroqua, Wis.; Mich. College of M & T, B.S.F., 1956.

No Section

Junior Grade

O'Keefe, T. G., Asst. Cons. of Forests, Ghana Forests Dept., Ghana, W. Africa; State Univ. of N. Y., B.S.F., 1955.

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Forestry News

THE WORLD'S LARGEST laminated wood gavel was presented to Walter M. Leuthold (*left*) of Deer Park, Wash., president of NLMA, at the opening of their 1957 annual meeting, Nov. 10-13 in Washington, D. C. At right is William P. Davis, president of Potlatch Forests, Inc., Lewiston, Idaho, the company which produced the gavel from seven different species of commercial lumber grown in the Inland Empire. The species are Idaho white pine, ponderosa pine, white fir, larch, spruce, cedar, and Douglas-fir.

U. S. Forest Service Establishes Hawaii Project

Robert E. Nelson, specialist in wildland surveys at the California Forest and Range Experiment Station, has been appointed leader of the first U. S. Forest Service project to be established in Hawaii.

He transferred to the Honolulu headquarters of the new project in November, according to Dr. Keith Arnold, director of the experiment station.

Nelson will be in charge of two major activities under the general supervision of Dr. Arnold: a survey of the timber resources of the Territory and liaison between the Territorial Forest Service and U. S. Regional Forester Charles A. Connaughton at San Francisco.

A forestry graduate of the University of California, Nelson has worked for the Forest Service since 1941.

During the World War II Nelson was an Air Force navigator and is currently a lieutenant-colonel in the Air Force.

Watershed Management Required by Lease

The Bethlehem Authority, a quasi-municipal agency that leases to the City of Bethlehem, Pa., its municipal water system, including a 15,000 acre wooded watershed, has recently floated an $8 million bond issue for the purpose of constructing a second reservoir. As part of this bond issue a section of the Agreement and Lease between the Bethlehem Authority and the City of Bethlehem requires the employment of a forester. The clause reads as follows:

> The City agrees that, at all times during the term of this Agreement and Lease (38 years), it will continuously employ or cause to be employed a forester, who has been graduated from a Forestry School which is accredited by the Society of American Foresters, to protect and manage the Authority's forested watershed in the Wild Creek and Tunkhannock Creek drainage area.

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National Lumber Directors Meet

Directors of the National Lumber Manufacturers Association voted a dues increase, called for progressive tax reduction, and appropriated $25,000 to lay the groundwork for a national wood merchandising program.

These were the highlights of action taken at the 1957 annual meeting of NLMA directors and committees, November 10-13 at the Shoreham Hotel, Washington, D. C. Attended by more than 300 persons, the meeting was the largest in recent NLMA history.

N. Floyd McGowin of Chapman, Ala., was elected president of the association, succeeding Walter M. Leuthold of Deer Park, Wash. Leuthold was elected NLMA board chairman, succeeding Lawrence D. Kellogg of Alexandria, La., who becomes Policy Committee chairman. Elected first vice president was Robert M. Ingram of Aberdeen, Wash.

New regional vice presidents of NLMA are A. B. Hood of Anderson, Calif.; Edwin R. Thomas of St. Louis, Mo., and Q. T. Hardtner, Jr., of Urania, La.

In other actions related to forestry: The association was authorized to hire an additional staff member to launch a special educational guidance program. The program provides for the publication of booklets on career opportunities in the forest products industries and the field of wood technology. These publications, to be prepared in cooperation with the Forest Products Research Society of Madison, Wis. will be distributed to the students and educational guidance counselors of high schools and colleges throughout the country. Over-all direction of the program will come from a permanent NLMA Committee on Education.

* Called on the Forest Industries Council, policy coordinating organization of the lumber, paper, and pulpwood industries, to establish a National Forest Pest Action Committee. Purpose of the committee would be to advise public and private agencies on current forest insect and disease problems and help coordinate public-private programs in this field.

* Urged Congress to approve legislation providing for a study and realignment of the federal-state-private land ownership pattern.

* Endorsed the holding of a World Forestry Congress in the U. S. in 1960 but called for a ban on representatives from Russia and other Communist nations.

* Authorized NLMA to award four to six $500 scholarships in 1958 to outstanding forestry school students. The scholarship will include six weeks' on-the-job training in wood products research at the Washington, D. C., laboratory of the Timber Engineering Co., NLMA's research-engineering affiliate.

Private and Industrial

International Paper Foresters Promoted

Promotion and transfer of two foresters has been announced by International Paper Company's Long-Bell division.

Warren Goldsmith was named forester of the western timber department at Longview, Wash., after being resident forester at Weed, Calif., five years. He will coordinate International Paper's reforestation program on 346,000 acres of tree farms at Ryderwood, Wash.; Vernonia, Grand Roude, Vaughn, and Gardiner, Ore; and Weed.

Leonard C. Hines succeeded Goldsmith as resident forester at Weed. Hines was moved from Eugene, Ore., where he had been a timber cruiser for the company five years. He previously had been an assistant forester at Longview one year.

Goldsmith was graduated from the University of Idaho in 1949 with a degree in forest management, following nearly four years' service in the Navy during World War II.

He did general forestry for the Michigan California Lumber Co. at Camino, and the Georgetown Lumber Co., both in California, and then worked briefly for the U. S. Indian Service at Sacramento before joining International Paper at Weed in the summer of 1952.

Forester Named Lumber Company Manager

William C. Patterson has been appointed general manager of the Ward Lumber Company of Jay, N. Y., and Milton E. Dickerson has been appointed to succeed him as company forester, according to Sidney J. Ward, president of the company.

Patterson is a graduate of the New York State College of Forestry at Syracuse and is a veteran of World War II. Under his direction the company has developed 11 certified tree farms and has nine more in progress of development.

Dickerson is a forestry graduate of Pennsylvania State University and is an army veteran. He was formerly with the Pennsylvania Department of Forests and Waters and recently came to Ward Lumber Company from Northern Forests, Inc. of Hawley, Pa., where he was a division forester.

Veach Elected AFPI President

John B. Veach, Sr., Hardwood Corporation of America, Asheville, N. C., was elected president of American Forest Products Industries, Inc.

He succeeds Vertrees Young, Gaylord Container Corporation, Bogalusa, La.

Other officers elected at the annual

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meeting were John Hinman, International Paper Co., New York, and J. D. Bronson, Boise-Cascade Corp., Yakima, Wash., vice presidents; D. B. Frampton, D. B. Frampton & Co., Columbus, Ohio, treasurer; and C. A. Gillett, Washington, D. C., re-elected secretary and managing director.

Elected as trustees were D. S. Denman, Crown Zellerbach Corporation, San Francisco; James L. Madden, Scott Paper Co., Chester, Pa.; N. F. McGowin, W. T. Smith Lumber Co., Chapman, Ala.; Peter F. Watzek, The Crossett Co., Crossett, Ark., F. K. Weyerhaeuser, The Weyerhaeuser Timber Co., Tacoma, Wash.; C. Russell Johnson, Union Lumber Co., San Francisco; David L. Luke, West Virginia Pulp and Paper Co., New York; Mr. Bronson, Mr. Hinman, and Mr. Veach.

Lumber Industry Leader Retires

Harry G. Uhl, president, Timber Engineering Company, engineering and research affiliate of the National Lumber Manufacturers Association, retired November 12, 1957, after 37 years' service to the lumber and wood using industries.

Mr. Uhl announced his retirement at the annual meeting of the Board of Directors of the National Lumber Manufacturers Association and Timber Engineering Company. The occasion was marked with a special tribute to him by leaders of the lumber manufacturing industry for his long record of service.

At the meetings, the 25th anniversary of the Timber Engineering Company was celebrated. Mr. Uhl helped to establish the company in 1933 and was one of the original directors of the corporation.

Large NW Tree Farm Certified

Certification of the Scott-Skagit Tree Farm, consisting of approximately 100,000 acres of forest land owned by Scott Paper Company in Skagit County, Wash., has been announced by the Industrial Forestry Association, Portland, Ore.

The area includes a large acreage of virgin old-growth timber and what is reported to be the largest stand of prime pulp-type timber under private ownership in the northern Puget Sound area. The original holdings in this area, known as the Lyman Timber Company, were acquired by the Soundview Pulp Company of Everett in 1937. Following the merger of Soundview and Scott Paper Company in 1951, the operations became a part of Scott Paper Company's timber division, serving Scott's West Coast pulp and paper mill at Everett.

James G. Rowbury, Everett, Wash., is chief forester for the company.

Inland Container Forester Honored

Roger W. Wolcott, mill division forester for Inland Container Corporation, has been named "Outstanding Forester of the Year" by the North Carolina Forestry Association after serving as president of the organization for seven years. The presentation was made by Dean R. J. Preston of the North Carolina State College of Forestry at a dinner in Asheville, October 12, concluding the association's annual convention.

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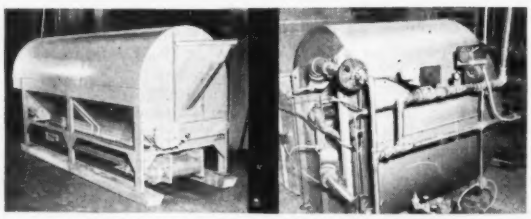

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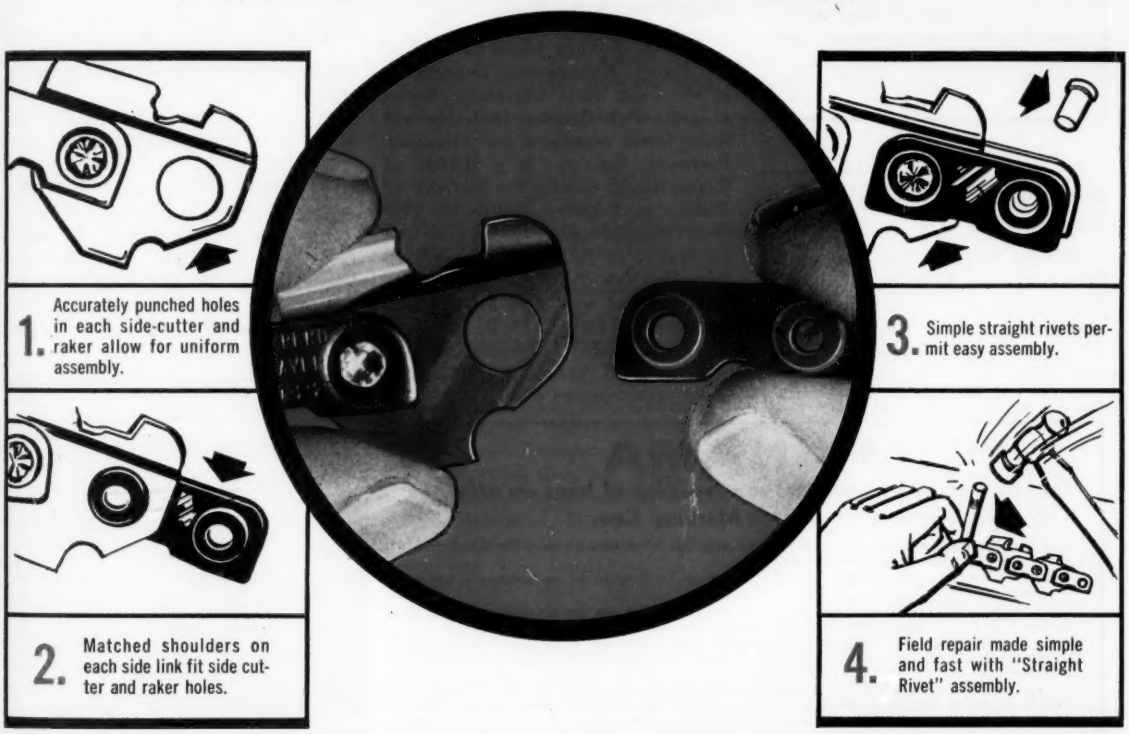

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Wolcott has been a resident of Rome, Ga. since August 1957 when he assumed his duties as Inland's wood and woodlands executive and established his headquarters at the Inland Container plant at Krannert Station, Rome, Ga.

Shepard with Hiabob Hydraulics

H. M. Shepard, formerly with the American Pulpwood Association, has taken a position with Hiabob Hydraulics, Inc., Ely, Minn.

The company manufactures four types of hydraulic pulpwood and log loaders and is planning additional specialized logging and pulpwood equipment.

Education

New North Carolina Laboratory Dedicated

A new $300,000 pulp and paper laboratory was formally dedicated at North Carolina State College in October by Governor Luther H. Hodges. It has been named the Reuben B. Robertson Laboratory of Pulp and Paper Technology in honor of a prominent North Carolina pulp and paper industrialist who has been a leader in forest conservation and in strengthening the pulp and paper program at the college, especially through his support of the Pulp and Paper Foundation there. A chief purpose of the Foundation is scholarship support for students in that program. Dean R. J. Preston reports that for the current school year 43 students are receiving $24,900 in aid from the Foundation.

Joins Utah State Staff

Dean N. Quinney joined the staff of the Forest Management Department at the Utah State University beginning the Fall Quarter 1957. He will teach forest economics and valuation. Professor Quinney is a native of Pennsylvania, earning his Bachelor of Science in Forestry degree in 1950 from Pennsylvania State University, his Master of Science degree in 1954 from the New York State College of Forestry, and completed his residence requirements for the Ph.D. degree at Michigan State University in the spring of 1957. He is a member of Xi Sigma Pi, Gamma Sigma Delta, and Society of American Foresters. He joined the staff directly from the Lake States Experiment Station where he has been working on the forest survey.

Adds to Research Staff

A forest physiology research specialist has been added to the faculty at S. F. Austin State College, Nacogdoches, Tex.

The appointment of Dr. M. Victor Bilan as assistant professor was announced by Dr. Arne K. Kemp, head of the SFA forestry department.

Dr. Bilan, a native of West Ukraine but now an American citizen, will concentrate on research work. His appointment increases to six the number of SFA forestry professors who include: Dr. Kemp, Dr. Nelson Samson, Dr. Richard Wallace, Dr. Robert Baker, and Ellis V. Hunt.

The new professor went to SFA from Duke University, where he took the M.F. and the Doctor of Forestry degrees and where he has held a position as research assistant with the School of Forestry.

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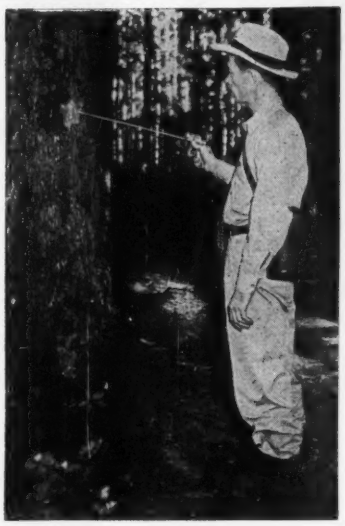

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Yale Plans for New Laboratory Announced

Yale University will start construction this January on a new $575,000 laboratory for its School of Forestry. The one-story building is scheduled for occupancy by next September.

Dean George A. Garratt of the School of Forestry, said the new building will be named the William B. Greeley Memorial Laboratory in honor of one of the nation's greatest leaders in industrial forestry. Mr. Greeley, a graduate of the Yale University School in 1904, died in 1955 in Suquamish, Wash.

The Greeley Laboratory will provide facilities for research work currently being carried out by Yale in Valhalla, N. Y., as well as providing much-needed space for the School's expanding program in wood technology.

"The new laboratory," Dean Garratt said, "will make it possible to consolidate all forestry school research work and graduate instruction in New Haven."

Funds for the building have been received by Yale in the last few years from alumni and friends of the School of Forestry including forest industries and the John A. Hartford Foundation.

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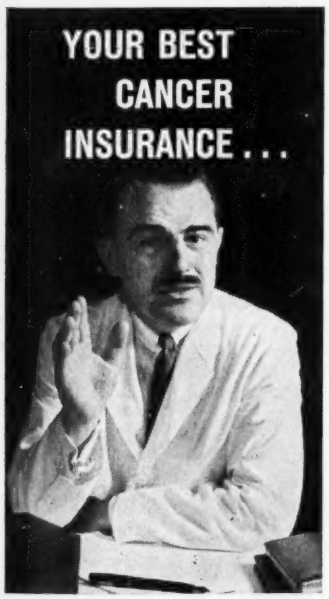

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Public

Olympic Supervisor Named

Promotion of Lloyd G. Gillmor to the position of forest supervisor of the Olympic National Forest with headquarters at Olympia, Wash., has been announced by Forest Service Regional Forester J. Herbert Stone at Portland, Ore. Gillmor replaced Mason Bruce who was transferred to the Alaska region. Since April of this year Gillmor has been on the staff of the Division of Timber Management in the regional headquarters of the Pacific Northwest Region at Portland. He previously was on the staff of the forest supervisor, Fremont National Forest, in south central Oregon at Lakeview. There he was in charge of timber management and recreation use.

Appointment of J. M. Owens as Director, BDSA Forest Products Division

The appointment of James M. Owens as director of the Forest Products Division of the Business and Defense Services Administration, U. S. Department of Commerce, has been announced by BDSA Administrator H. B. McCoy.

Mr. Owens succeeds Morlan J. Grandbois, who returned to private industry after serving as WOC director of the Division from April 1 through September 30 of this year.

Prior to this appointment, Mr.

Forestry Employment

S.A.F. members are privileged to insert one 60-word advertisement in this column without charge. Forest industries desiring to employ foresters may insert advertisements at the rate of $4 per column inch. Copy must be received by the end of this month for an advertisement to appear in the issue after next.

Obviously, the Society cannot assume responsibility beyond making it possible for prospective employee and employer to enter into negotiations.

Positions Wanted

Forester, B.S.F., 1949 and work toward advanced degree. Age 31, married, 2 children. Eight years experience in public forestry including aerial photo interpretation and forest survey techniques, cruising, timber sales appraisals and administration, fire control, general land management, and personnel management. Presently in supervisory position in West. Interested in timber management or supervisory work with private industry in Lake States.
Box S, Journal of Forestry, Mills Building, Washington 6, D. C.

Forester, B.S., Botany, 1951 and M.F., 1955, Yale. Age 28, married, three children. Electronics officer U. S. Navy three years. Experience in state forestry, inventory, timber taxation in Pacific Northwest. Desire position in private industry offering opportunity for advancement. Pacific Northwest preferred, other regions considered.
Box T, Journal of Forestry, Mills Building, Washington 6, D. C.

Experienced forester, thoroughly qualified in timber and land management, cruising, fire control, planting, appraisal, resource surveys, scaling, timber sales, farm forestry, land surveying. Extensive additional experience in equipment maintenance and personnel management. Two years state forestry; six years private forestry (present employment). Desire permanent position, limited traveling. Location U.S.A., Canada, or Mexico. Age 41 with family, B.S.F., M.F.
Box U, Journal of Forestry, Mills Building, Washington 6, D. C.

Forester, B.S., age 33, married, two children. Experience: Three years county forester; five years with large tree expert company in measuring, estimating, and bidding utility right-of-way brush spraying, brush and timber cutting, and tree trimming; also sales, administration, and planning operations. Desire employment with utility or similar company.
Box V, Journal of Forestry, Mills Building, Washington 6, D. C.

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Owens had served as deputy director of the Division since July 1956, after having been assistant director of the Division since October 1953. He came to BDSA at that time from the position of chief, industrial engineering, Office of the Quartermaster General.

Eastern Region Staff Appointments Announced

Four recent appointments to fill staff vacancies have been announced by Hamilton K. Pyles, regional forester of the Eastern Region, U. S. Forest Service, with headquarters at Upper Darby, Pa.

Chalmer K. Lyman has been named chief of the Region's Division of Operation, Fire Control, and Personnel Management. Before this assignment Mr. Lyman served in the Washington Office in the Divisions of Operation and Fire Control.

Marlin C. Galbraith, going to the Northeastern Region from a staff position in the Rocky Mountain Regional office, will be chief of the Section of Timber Management, Division of Resource Management.

Samuel P. Shaw is new chief of Wildlife Management, Division of Resource Management. He has been wildlife research biologist with the U. S. Fish and Wildlife Service, at Washington, D. C., since 1951.

Frank E. Casanova has become position classifier, Division of Personnel Management, transferring from a ranger's post on the Apache National Forest.

Ernest Wright Joins Oregon Center

Dr. Ernest Wright, U. S. Forest Service pathologist, who retired on September 30, 1957, has accepted a position with the Oregon Forest Lands Research Center, Corvallis, Ore. Wright will be engaged in various studies dealing with all phases of forestry from the nursery to the merchantable tree.

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R. M. Beeman to R.O. Assignment

Promotion of Robert M. Beeman from the forest supervisor's staff, Wenatchee National Forest, to staff officer in the division of Timber Management in the regional office of the U. S. Forest Service, Portland, Ore., according to an announcement by Regional Forester J. Herbert Stone. Beeman has been handling fire control activities on the Wenatchee forest since 1954. His promotion fills the vacancy caused by the promotion of Lloyd Gillmor, the newly named forest supervisor of the Olympic National Forest.

D. P. Lowery Joins Intermountain Staff

David P. Lowery of the Forest Products Laboratory, Madison, Wis., has just been appointed to the staff of Intermountain Forest and Range Experiment Station. He will work with Edward S. Kotok, chief of the Division of Forest Utilization Research.

At the Forest Products Laboratory, Lowery had been conducting research in adhesives and lamination. He previously taught wood technology at the Stephen F. Austin College in Texas.

Consulting Foresters

Approved for Listing on January 1, 1958, by the
SOCIETY OF AMERICAN FORESTERS

The following list of Consulting Foresters is published by the Society of American Foresters for the information of prospective clients.

Individuals listed are members of the Society of American Foresters and as such are believed qualified and competent to perform the technical services specified. However, the Society cannot assume responsibility for the actions of individuals or firms listed.

Permission to publish or reproduce this list in whole or in part, but without unauthorized additions, is hereby granted. Revised lists will be issued annually.

*Member, Association of Consulting Foresters.

Code of Fields of Specialization

1. Arboriculture and tree preservation.
2. Cost and economic studies of forest operations.
3. Forest and wood utilization.
4. Forest management and silvicultural practice.
5. Forest protection from disease.
6. Forest protection from fire.
7. Forest protection from insects.
8. Forest taxation.
9. Game and wildlife management.
10. Logging engineering.
11. Market studies and trade promotion (forest products).
12. Naval stores operations.
13. Pulpwood operations.
14. Range management.
15. Surveying and mapping.
16. Timber valuation and appraisal.
17. Timber volume and quality estimates.
18. Tree planting and reforestation; reproduction studies.
19. Wood preservation.
20. Wood seasoning.
21. Wood technology.

Adirondack Forestry, Inc., Wilmington, New York.
Forest Consultants: Donald E. Peterson, David E. Strong.
Territory: Northeastern U. S., esp. Adirondack Mountains.
Specialization: 3, 4, 5, 6, 7, 8, 9, 15, 16, 17, 18, 19. Also aerial photo interpretation, timberland and brokerage service, and forest plantation management.

Ernest E. Ahler, Forest Consultant, Route 2, Bishop Road, Knoxville 18, Tennessee.
Territory: Southeast.
Specialization: 2, 3, 4, 6, 13, 16, 17, 18. Also preparation, negotiation or advertisement, and administration of timber sales for large and small timber landowners, boundary line establishment, contract sawmilling, and reforestation.

Thos. W. Alexander, Consulting Forester, Waynesville, North Carolina.
Territory: South, Central States, and Appalachians.
Specialization: 2, 4, 11, 16, 17.

Glenn O. Antonie, Consulting Forester, 411 South Walnut, Demopolis, Alabama.
Territory: Alabama, Mississippi.
Specialization: 2, 3, 4, 5, 6, 7, 8, 12, 13, 15, 16, 17, 18. Also agent for absentee timber owners; timber sales and cutting supervision; forest litigation.

S. Gayley Atkinson, Consulting Forester, Huntingdon Road, Huntingdon Valley, Pennsylvania.
Territory: Pennsylvania.
Specialization: 1, 18.

Atlantic States Forestry Company, Carthage, North Carolina.
Territory: Eastern and southern United States.
Specialization: 2, 3, 4, 8, 9, 15, 16, 17, 18. Also forest damage appraisals, litigation, timberland sales and purchases, aerial photo-controlled cruises, and reconnaissance from aircraft.

Arthur G. Axtell, Consulting Forester, N. Old Forge Road, Glens Falls, New York.
Territory: Northeast.
Specialization: 2, 3, 4, 8, 11, 13, 15, 16, 17, 18. Also timber purchases and sales.

***Henry L. Bango**, Consulting Forester, P. O. Box 4072, Shreveport, Louisiana.
Consultant: Frank Gaenschals.
Territory: Northern Louisiana, south Arkansas, east Texas.
Specialization: 3, 4, 5, 16, 17, 18. Also purchase and sale of timbered properties.

George Banzhaf & Company, 662 North Water St., Milwaukee 2, Wisconsin.
Territory: Not limited.
Specialization: 2, 3, 4, 11, 13, 15, 16, 17.

W. R. Barnhill, 1113 Gillespie Ave., Albany, Georgia.
Specialization: 4, 11, 12, 15, 17, 18. Also forest damage investigations, tree planting (contract).

Curtis H. Bauer, Consulting Forester, 54 Dearborn Street, Jamestown, New York.
Territory: Western New York and Pennsylvania.
Specialization: 2, 3, 4, 13, 16, 17, 18. In addition to serving the local lumber industry and woodland owners, services are designed for the Christmas tree industry.

Russell W. Beeson, Wildlife Management Consultant, 324 Pomona Avenue, El Cerrito, California.
Territory: California.
Specialization: 4, 6, 9, 14, 16, 17, 18. Also management of combination range and timber properties, flood control surveys, and national forest land exchanges.

Belanger and Bourget, Land Surveyors and Forest Engineers, 86 Cote de la Montagne, Quebec, Canada.
Consultant: M. Albert Bourget.
Territory: Canada, especially Quebec.
Specialization: 2, 3, 4, 10, 11, 13, 15, 16, 17, 19, 20, 21. Also boundary lines.

Frank W. Bennett & Associates, Consulting Foresters, 4767 Convention St., Baton Rouge, Louisiana. (Field Hdqrs. at Norwood, La., and Natchitoches, La.)
Consultants: Frank W. Bennett, James E. Moore, and Lewis C. Peters.
Territory: Southern U. S.
Specialization: 3, 4, 6, 10, 11, 16, 17, 18. Retained as consultants by medium size landowners (500 to 50,000 acres). Manage all forest land resources, including timber, grazing, wildlife, minerals, etc. Make plant location surveys for large wood using plants (pulp mills).

Bigley and Feiss, Foresters, Inc., 767 Blair Blvd., Eugene, Oregon.
Consultants: Sherman Feiss, John Venator, Howard G. McDowell, and William F. Smith.
Territory: Washington, Oregon, California.

John C. Billingsley, Forest Consultant, 924 Fair Street, Newberry, South Carolina.
Territory: South Carolina and Georgia.
Specialization: 3, 4, 6, 9, 10, 15, 16, 17, 18.

Bishop Brothers, Consulting Foresters, Marion, South Carolina.
Consultants: H. F. Bishop, Marion, S. C., R. Q. Bishop, Florence, S. C.
Territory: South Carolina and southeastern United States.
Specialization: 3, 4, 6, 8, 10, 13, 15, 16, 17, 18.

L. L. Bishop, Forest Consultant, 7034 Airline, Houston 9, Texas.
Territory: East Texas.
Specialization: 4, 6, 16, 18.

Lewis M. Boice, Consulting Forester, Orangeburg, South Carolina.
Territory: Within 100 miles of Orangeburg.
Specialization: 4, 6, 15, 16, 17.

H. E. Bovay, Jr., Consulting Engineers, 933 W. Third Ave., Spokane 4, Washington.
*Carl R. Dion and James R. Craine, foresters.
Territory: Inland Empire.
Specialization: 2, 3, 4, 6, 8, 10, 11, 13, 15, 16, 17, 21. Also timber sales contract preparation and administration, ownership and cutting line establishment, growth and yield computations.

***William J. Bozett**, Consulting Forester, Logan, Ohio.
Territory: Unlimited.
Specialization: 2, 3, 4, 5, 6, 7, 10, 11, 13, 15, 16, 17, 18, 20. Forest management and marketing, land acquisition for investors, damage appraisals, Christmas tree management and tree planting, serving industry.

Allen W. Bratton, Consulting Forester, Shelterwood, Cooperstown, New York.
Territory: Northeast.
Specialization: 4, 5, 6, 7, 8, 11, 15, 16, 17, 18.

Brown and Brown, Forest Engineers, 614 Lewis Building, Portland 4, Oregon.
Consultants: Eugene R. Walsh (S.A.F. Associate Member), Samuel Rotschy.
Territory: Pacific coast.
Specialization: 2, 3, 4, 6, 8, 10, 11, 12, 15, 16, 17, 18.

Nelson C. Brown, Consulting Forester, 122 Dorset Road, Syracuse 10, New York. During summers, Milford, Pa.
Territory: Northeast.
Specialization: 2, 3, 8, 10, 11, 13, 16, 17.

Paul E. Bruns, 119 Mount Avenue, Missoula, Montana.
Territory: Not limited.
Specialization: 2, 4, 8, 11, 16, 17.

Charles H. Bunting, Consulting Forester, 2455 Placer St., Redding, California.
Territory: Pacific Coast.
Specialization: 2, 10, 15, 16, 17.

Robert H. Cain, Consulting Forester, 1423 College Drive, Pineville, Louisiana.
Territory: Louisiana.
Specialization: 4, 6, 7, 13, 15, 16, 17, 18. Timberland agent, private and industrial.

Cal-Pacific, Forest Consultants, 3030 Pope Ave., Sacramento 21, California.
Consultants: James E. Greig, Harvey A. Striplin, Jr.
Specialization: Timber management, cruising, sales.

***N. D. Canterbury**, Consulting Forester, Parklane Apts. 310, 5701 Jackson St., Houston 4, Texas.
Territory: Texas and southeastern U. S.

Capital Forestry Co., Inc., 2967 Troy Road, Schenectady 9, New York.
Consultant: Ernest L. Handy, Forester and Landscape Architect.
Territory: New York, New England States, Pennsyivania, and New Jersey.
Specialization: Timber cruising, marking and marketing studies, arboriculture, landscape designing and planting, tax and insurance appraisals. Experienced in court testimony as qualified expert.

Dudley C. Carey, 116 Fairmeade Road, Louisville 7, Kentucky.
Territory: Not limited.
Specialization: Forest and wood utilization, wood preservation, wood seasoning, wood technology. Also planning for wood conversion operations.

Carl M. Carpenter, Consulting Forester, Nashville, Indiana.
Territory: Indiana.
Specialization: 2, 4, 5, 6, 15, 16, 17, 18.

Clifford B. Carts, Consulting Forester, Box 267, Coudersport, Pennsylvania.
Territory: Pennsylvania, New York, Ohio.
Specialization: 3, 4, 8, 10, 11, 15, 16, 17, 18. Also timber trespass and timber damage appraisal; management agent for timberland owners.

Ralph E. Chamberlin, Consulting Forester, River House 810, 2311 N. Front Street, Harrisburg, Pennsylvania.
Territory: Eastern United States.
Specialization: 2, 4, 15, 16, 17, 18. Also timber investment, farm and forest real estate, forest tree nurseries, Christmas tree management, and Harrisburg representative.

Charles Edward Cheston & Company, Forest Land Management Consultation, The University of the South, Sewanee, Tennessee.
Specialization: 2, 4, 6, 10, 11, 13, 15, 16, 17, 18, 20, 21.

Edward J. Clancy, 1916 Sylvan Road, S. W., Atlanta, Georgia.
Territory: Northern Georgia and adjoining states.
Specialization: 4, 15, 16, 17. Also agent for timber owners.

Stuart F. Clark, Consulting Forester, Box 3222, Bellaire, Texas.
Territory: Southern United States.
Specialization: Forest management, appraisals, investments.

Francis H. Clifton, Private Forester, P. O. Box 326, DeLand, Florida.
Territory: Southeast U. S. A.
Specialization: General forestry, registered real estate broker, forestry exhibits sales.

D. Irving Cobb, 447 W. French St., Willows, California.
Territory: California.
Specialization: 2, 3, 4, 8, 10, 15, 16, 17, 18.

John D. Coffman, 1759 Spruce St., Berkeley 9, California.
Territory: Principally California.
Specialization: 5, 6, 7, 16. Also forest and park recreational management.

***T. S. Coile**, Land Consultant, Rt. 2, Box 376, Durham, North Carolina.
Specialization: Soil productivity and its implications in forest land management. Soil surveys and their interpretation for forest management. Forest management planning based on integration of ecological and financial factors. Land evaluation.

Commercial Foresters, Inc., P. O. Box 1274, Asheville, North Carolina.
Forester: Richard A. Wood.
Territory: Appalachian and Southeastern.
Specialization: 2, 3, 4, 10, 11, 13, 16, 17, 18. Also complete timber marking and sale service and watershed management.

Connwood, Inc., P. O. Box 111, Rockfall, Connecticut.
Consultants: Ralph C. Hawley, Michael M. Pochan, Jr., Sherman H. Perkins.
Territory: Connecticut, Rhode Island, and adjacent areas.
Specialization: 3, 4, 10, 11, 13, 15, 17, 18, 19, 21.

David B. Cook, Consulting Forester, 12 McPherson Terrace, Albany 6, New York.
Territory: Eastern New York.
Specialization: Planted larch, chemi-peeling, and basal spray.

***Philip T. Coolidge**, Consulting Forester, retired. Box 102, Bangor, Maine.
General forestry.

William T. Cox, Consulting Forester and Biologist, 2186 Doswell Avenue, St. Paul 8, Minnesota.
Territory: General.
Specialization: Appraisals of forest properties; development of furbearers and other wildlife; selection of new locations for woodworking plants.

Porcius F. Crank, Jr., Consulting Forester, Point Harbor, Currituck County, North Carolina.
Territory: North Carolina and Virginia.
Specialization: 4, 5, 6, 7, 13, 15, 16, 17, 18. Also registered surveyor.

***Keith Cranston**, Leland, Mississippi.
Territory: Mississippi River Delta, entire Gulf Coast and Southeast hardwood bottomlands and pine types.
Specialization: Pine and bottomland hardwood management, and supplemental commercial cruising. Retained in consultant capacity by firms operating in the South, and as consultant-manager for private landowners of bottomland hardwood and pine tracts. Appraisal of Estates and and division of lands. Loan appraisals.

Lucas M. Dargan, Consulting Forester, P. O. Box 167, Darlington, South Carolina.
Territory: Coastal Carolinas.
Specialization: 4, 6, 9, 16, 17, 18.

***John F. Davis,** Ironshire and Mumford, Snow Hill, Maryland.
Territory: Eastern and Southeastern states.
Specialization: 2, 3, 4, 11, 13, 16, 17, 18.

Paul B. Davis, Consulting Forester, 118 E. Malta Road, Oak Ridge, Tennessee.
Territory: Tennessee, Kentucky.
Specialization: 1, 2, 3, 4, 13, 16, 17, 18.

Randle J. Dedeaux, Consulting Forester, P. O. Box 57, Perkinson, Mississippi.
Consultant: Randle J. Dedeaux.
Territory: Southern Mississippi; longleaf and slash pine types.
Specialization: 4, 13, 15, 17. Also growth studies, timber marking and marketing, and agent for absentee timberland owners.

Deep South Consulting Foresters, 961 Briarcliff Road, Tallahassee, Florida.
C. H. Schaeffer, Chief Forester.
Territory: Alabama and south Georgia.
Specialization: 1, 6, 7.

Elwood L. Demmon, 241 Old Toll Road, Asheville, North Carolina.
Territory: Unlimited.
Specialization: Consultant on forest management policy for large forest properties; review and criticism of forestry research programs.

H. C. Dickerson, Consulting Forester, P. O. Box 348, Kilgore, Texas.
Territory: Texas and Louisiana.
Specialization: 2, 4, 5, 16, 18, and 19.

Di Stefano & Wessel, Attorneys and Counsellors at Law, 1411 Walnut Street, Philadelphia 2, Pennsylvania.
Consultant: Henry Wessel.
Territory: Northeast and Middle Atlantic Region.
Specialization: 2, 8, 11, 15, 16, 17. Also general business problems including the formation of partnerships, corporations, financing and litigation; timber sales, probate work, estate planning and taxation.

W. T. Doherty, Consulting Forester, 421 Morningside Dr. N. E., Albuquerque, New Mexico.
Territory: Arizona, New Mexico.
Specialization: 4, 15, 16, 17. Also land classification.

Eastern Forestry, Inc., Box 129, Hampton, Virginia.
Operating and Consulting Forester: *Edward Stuart, Jr.
Territory: Eastern U. S.
Specialization: 2, 3, 4, 10, 11, 13, 14, 15, 16, 17, 18. Also investigations and arbitration of claims; operational management in manufacturing and marketing of forest products.

William A. Eastman, Jr., Consulting Forester, William A. Eastman & Co., Inc., 410 Green Building, Seattle 1, Washington.
Territory: Pacific Northwest.
Specialization: 10, 15, 16, 17, 18. Also preparation and administration of timber sales, land appraisal, timberland brokerage, and timberland management.

James E. Ebert, Consulting Forester, Pembroke, North Carolina.
Territory: Eastern North Carolina.
Specialization: 4, 6, 13, 16, 17.

W. G. Edwards, 503 West Fairmount Ave., State College, Pennsylvania.
Specialization: 3, 10, 13, 15, 16, 18. Also small sawmill problems, both logging and milling phases.

Inman F. Eldredge, Sr., 1354 Moss Street, New Orleans 19, Louisiana.
Territory: Lower South.
Specialization: Resource surveys for large operations; advice and counsel in large-scale land purchase programs; consultation with forestry staffs on management policy and practice in larger operations.

Employment Service, Forestry Personnel, Leland, Mississippi.
Consultant: *Keith Cranston, Personnel director.
Specialization: Personnel placement service provided professional foresters and timbermen. Service to industry.

L. J. Enright, Consulting Forester, 322 Scott Drive, Silver Spring, Maryland.
Territory: Maryland; not limited.
Specialization: 1, 6, 15, 18. Also park management and policy; landscape planting and design.

Farmcraft Associates, Inc., Forest Managers, 619 Washington Street (Box 4344), Alexandria, Louisiana, Box 293, Eunice, Louisiana, and 125 Dixie, Oakdale, Louisiana.
Consultants: John J. Carroll and Printis E. Murphy.
Territory: Southern U. S.
Specialization: Forest investments and technical forest management for private and industrial holdings. Also litigation and damage appraisals.

Fenner & Day Company, Inc., Forest Fire Protection Engineering, 4355 Bermar Avenue, Richmond 11, Calif.
Consultant: Ralph L. Fenner.
Territory: California.
Specialization: 2, 4, 6, 14. Wildland fire control and use.

***David S. Findlay,** Consulting Forester, 20 East 5th Street, Jamestown, New York.
Territory: Western New York and Pennsylvania.
Specialization: 4, 15, 16, 17.

George M. Fisher, Consultant Landscape Forester, P. O. Box 971, Tyler, Texas.
Territory: Northeastern Texas.
Specialization: 1, 5, 7, 9, 18. Also city forestry and shade tree problems; landscape design, construction, and maintenance; forest parks and recreational planning.

Reginald D. Forbes, Consulting Forester, R.F.D. 1, Ambler, Pennsylvania.
Territory: Eastern U. S.
Specialization: 4, 6, 17, 18. Also forest resource surveys of timber available to manufacturing plants in specified territories.

Forest Land Management Co., P. O. Box 1046, Morgantown, West Virginia.
Consultant: Thomas G. Clark.
Territory: West Virginia, western Pennsylvania, western Maryland.
Specialization: Forest land appraisal, forest real estate, timber sales, and markets.

Forest Products Management Company, 1504 Broad Street, Camden, South Carolina.
Consultant: H. R. Oliver.
Territory: Southeast.
Specialization: 2, 3, 4, 6, 7, 11, 15, 16, 17, 18. Also land appraisals, timber and land sales. South Carolina registered land surveys and dogwood and hickory industry consultant.

Forestry Associates, Inc., P. O. Box 72, Hart, Michigan.
Territory: Michigan.
Specialization: 3, 4, 5, 6, 7, 9, 11, 13, 15, 16, 17, and 18.

Forestry Consulting Services, Deluxe Building, 297 West Michigan Avenue, Jackson, Michigan.
Consultant: George D. Blair, registered forester.
Territory: Nationwide.
Specialization: 1, 2, 4, 11, 16, 19. Also various forest growth and vegetative control planning services to public utility industry.

Forestry Suppliers, Inc., Consulting Foresters and Suppliers, Battlefield Station, Jackson 4, Mississippi.
Consultants: *James W. Craig, Ivo W. Miller, and Purvis R. Huff.
Territory: Gulf States.
Specialization: 3, 4, 6, 13, 15, 16, 17, 18. Also forest land analysis and management, growth studies, timber and land sales, and a complete line of supplies and equipment for foresters and timber owners.

John S. Forrest, Consulting Forester, 198 Maxwell, Eugene, Oregon.
Territory: Douglas-fir region.
Specialization: 2, 3, 4, 6, 15, 16, 17, 18. Also negotiation and administration of private timber sale contracts; aerial photography procurement contracts; property management for absentee owners: industrial inventory and sustained yield programs.

E. A. Foster, 204 E. Azalea St., Lakeland, Florida.
Territory: Southeastern United States.
Specialization: 2, 4, 5, 6, 7, 8, 13, 15, 16, 17, 18. Also timber marketing services and aerial photo interpretation.

Harvey R. Frantz, Forest Consultant, 1926 Jennings St., Bethlehem, Pennsylvania.
Territory: Eastern United States and Latin America.
Specialization: 3, 4, 11, 13, 16, 17.

R. C. Fraunberger, Forest Products Business Consultant (registered forester), 626 Black Rock Road, Bryn Mawr, Pennsylvania.
Specialization: 2, 3, 4, 10, 11, 16, 17, especially in hardwoods, domestic and foreign.

***E. A. Friend, Jr.,** 1008 Delaware Avenue, Suffolk, Virginia. (Inactive.)
Territory: Tidewater and Eastern Shore of Virginia, northeast North Carolina.

Specialization: 4, 15, 16, 17. Absentee landowners' agent, damage, trespass, and condemnation claims.

Emanuel Fritz, Consulting Forester, 102 The Uplands, Berkeley 5, California.
Territory: West; pine, redwood, and fir.
Specialization: 2, 3, 4, 6, 10, 11, 16, 17, 18, 19, 20, 21. Also consultant on state forest and park management and policy.

LeRoy Frontz, Consulting Forester, Allenwood, Pennsylvania.
Territory: Eastern U. S.
Specialization: 3, 4, 5, 6, 7, 9, 16, 17, 18. Also landscaping, forest and ornamental nurseries, farm forestry, forest parks and recreation, landuse planning, soil conservation, farm evaluation and appraisal.

Edward P. Furlow, 810 Gouthier Road, Falls Church, Virginia.
Territory: Virginia, Maryland, West Virginia.
Specialization: 2, 3, 4, 6, 8, 13, 16, 17, 18, 19, 20.

William E. Garvey, Jr., La Plata, Maryland.
Territory: Southern Maryland.
Specialization: Timber cruising, appraisal, and marking.

Paul H. Gerrard, Route 3, Russellville, Arkansas.
Territory: Arkansas.
Specialization: 4, 6, 16, 17, 18.

A. R. Gobeil, Consulting Forest Engineer, 100 d'Youville Square, Quebec, Canada.
Territory: Province of Quebec.
Specialization: 2, 3, 4, 7, 9, 10, 11, 13, 15, 16, 17. Also broker in timber properties and forest limits.

Paul N. Goodmonson, Consulting Forester, 1355 Alta Vista Drive, Corvallis, Oregon.
Territory: Oregon, Washington, northern California.
Specialization: 3, 4, 9, 13, 15, 16, 17, 19. Complete timberland management, timber sales, timber and land acquisition, and agent for absentee forest owners.

Goodwin & Davis, Consulting Foresters, 6330 Park Avenue, Indianapolis, Indiana.
Consultants: Robert F. Davis, Donald K. Goodwin.
Territory: Indiana.
Specialization: 4, 10, 11, 16, 17, 18.

M. W. Gormely, B.C.R.F., P. Eng., Industrial and Consulting Forestry Service, Room 413, Dominion Bldg., 207 West Hastings St., Vancouver 3, B.C.
Territory: British Columbia: (No regional limitation).
Specialization: 2, 3, 4, 5, 6, 7, 8, 10, 11, 13, 15, 16, 17, 18. Also fire damage appraisal and timber insurance evaluation.

***R. W. Graeber,** Consulting Forester, 303 Hillcrest Road, Raleigh, North Carolina.
Territory: North Carolina.
Specialization: 4, 6, 13, 16, 17, 18. Also buying and selling timber and timberlands as service to either buyer or seller; adjusting problems arising from over-cutting or trespass.

Joseph F. Gray, Consulting Forester, R. D. #1, Kittanning, Pennsylvania.
Territory: Pennsylvania.
Specialization: Christmas tree plantation management and forest taxation.

Green's Timber Service, Johnson City, Tennessee.
Consultant: L. Stanley Green.
Territory: Southeastern U. S.
Specialization: 2, 3, 4, 6, 10, 13, 16, 17, 18. Also custom sawmilling.

W. H. Griffith, Forester and Surveyor, 1001 Ouchita Bank Building, Monroe, Louisiana.
Territory: Southern United States.
Specialization: 15, 16, 17.

Kenneth Wayne Guenther, Forest Products Industrial Engineer, 3915 N.E. Davis, Portland, Oregon.
Territory: Oregon, Washington, and California.
Specialization: Those fields relative to the industrial engineering applications to the forest products industries.

John G. Guthrie, Consulting Forester, Wiggins, Mississippi.
Territory: Mississippi.
Specialization: 4, 6, 12, 13, 16, 17, 18. Also agent for absentee owners. Land sales and acquisition. Timber stand improvement (weed tree elimination). Long-term management. Large scale planting. Timber marking and marketing.

Alvin B. Hafer, Consulting Forester, Laurinburg, North Carolina.
Territory: North Carolina, South Carolina, and Southeast.
Specialization: 4, 15, 16, 17. Also purchase and sale of timbered properties.

E. C. Haff, Consulting Forester, 836 Edisto Ave., Orangeburg, South Carolina.
Specialization: Managing forest lands.

***Albert G. Hall and Associates,** 810 18th Street, N. W., Washington 6, D. C.
Consultants: *Charles M. Schwartz, McClain B. Smith, Jr.
Specialization: 2, 3, 4, 5, 6, 7, 8, 10, 11, 13, 16, 17, 18. Also Washington representative.

Giles G. Hall, Professional Forester, 402 Cumberland Avenue, North Augusta, South Carolina.
Territory: South Carolina, Georgia.
Specialization: 2, 3, 4, 5, 6, 7, 10, 11, 13, 16, 17, 18. Also tree pruning in planted stands.

***Jack M. Hall,** Consulting Forester, P. O. Box 285, Moultrie, Georgia.
Territory: Georgia, Florida, Alabama, and South Carolina.
Specialization: 4, 5, 6, 7, 11, 12, 15, 16, 17, 18. Also contract tree planting and fire plow planting preparation.

Francis G. Hambrook, Consulting Forester, East Sandwich, New Hampshire (mailing address, R.F.D., Center Harbor, N. H.).
Territory: New Hampshire.
Specialization: 2, 4, 15, 17. Also management of timber properties and agent for absentee landowners, selective cutting, timber marking and marketing assistance, timber stand improvement work, including improvement cuttings in immature stands.

Carl Hammarstrom, Consultant Forester, P. O. Box 48, Bude, Mississippi.
Territory: Southwest Mississippi.
Specialization: 4, 15, 16, 17, 18. Timber sale administration, damage claims, county surveyor.

Hammon, Jensen, and Wallen, Mapping and Forestry Services, 660 Hegenberger Road, Oakland 21, California.
Consultants: Herbert A. Jensen, Arnold F. Wallen.
Territory: United States, Central and South America, and foreign.
Specialization: 2, 3, 4, 6, 8, 10, 11, 13, 15, 16, 17, 18. Also planimetric and topographic mapping, land net delineation, general land classification for appraisal purposes and ranchland management, and aerial photogrammetric consulting service.

David H. Hanaburgh, Consulting Forester, Buchanan, New York.
Territory: Northeast.
Specialization: 2, 3, 4, 9, 10, 11, 13, 16, 17. Also negotiation of rights for hunting, fishing, trapping and water storage.

Gene M. Harris, Registered Consulting Forester, 2112 Hagan Drive, Tallahassee, Florida.
Territory: Florida, Georgia, and Alabama.
Specialization: 3, 4, 5, 6, 7, 8, 9, 12, 13, 15, 16, 17, 18.

Arthur W. Hartman, Consulting Forester, 22 Princeton Way, N. E., Atlanta, Georgia.
Territory: Southern states.
Specialization: 4, 6. Prescribed burning, development planning, training and execution in silvicultural uses of fire with planned management of southern pines and for control of hazardous fuels. Also, fire protection planning, especially determining components of balanced mechanized fire control facilities and their tactical uses. (Registered forester, Georgia.)

Joseph F. Havel, Box 11, Pawley's Island and Georgetown, South Carolina.
Territory: North Carolina, South Carolina, Georgia, and Florida.
Specialization: 3, 4, 10, 11, 13, 16, 17.

E. T. Hawes, Consulting Forester, 2204 White Oak Drive, Valdosta, Georgia.
Territory: Southeast.
Specialization: 2, 4, 8, 11, 12, 13, 16, 17, 18.

Ralph W. Hayes, Consulting Forester, 2241 Myrtle Avenue, Baton Rouge, Louisiana.
Territory: Gulf States.
Specialization: 2, 3, 13, 15, 16, 17. Also investigation and settlement of claims regarding timber in use in the South.

George S. Haynes, Consulting Forester, S. 321 Bowdish Road, Opportunity, Washington.
Territory: Western Montana, northern Idaho, eastern Washington.
Specialization: 4, 6, 10, 15, 16, 17, 18.

V. W. Herlevich, Consulting Forester, 3627 Stratford Blvd., Wilmington, North Carolina.
Territory: North Carolina, South Carolina.
Specialization: 4, 6, 15, 16, 17. Also forest fire damage appraisals.

Halsey M. Hicks, Consulting Forester, Box 575, Brattleboro, Vermont.
Territory: Not limited.
Specialization: 2, 3, 4, 8, 15, 16, 17.

Monterey L. Holst, Consulting Forester, P. O. Box 125, East Greenwich, Rhode Island.
Specialization: 3, 4, 6, 9, 10, 13, 15, 16, 17, 18, 21.

Douglas F. Horan, Consulting Forester, 316 Windsor Street, Lakeland, Florida.
Territory: Southeastern United States, Central and South America.
Specialization: Complete timber sales service, foreign timber investigations, agent for absentee timber owners.

William P. House, Consulting Forester, Chesham, New Hampshire (R.F.D. Marlboro.)
Territory: New Hampshire and adjacent areas.
Specialization: 2, 3, 4, 16, 17. Marking and stumpage sales.

Richard F. Howard, Forestwald, Box 14, Franklinville, New York.
Territory: Pennsylvania, New York, New England.
Specialization: 3, 4, 6, 15, 16, 17, 18.

***T. M. Howerton, Jr.,** Forestry Consultant, Madison, Florida.
Territory: Southeastern states.
Specialization: Marketing, management, and forestry supplies.

John E. Hudson, 806 N. W. 21st Terrace, Gainesville, Florida.
Territory: Southeastern United States.
Specialization: 4, 12, 16, 17.

Gustaf W. Hult, Consulting Forester, 3029 Johnson Street, Corvallis, Oregon.
Territory: Oregon, California.
Specialization: 4, 16, 17. Forest fire insurance investigations. Timber sales, acquisition, and exchanges.

LeRoy W. Huntington, Consulting Tropical Forester, 870 Wesley Street, Baldwin, New York.
Territory: Latin America, Orient, Africa.
Specialization: 2, 3, 4, 10, 11, 15, 16, 17, 18; and tropical hardwoods.

R. Wilson Hutchison, Consulting Forester and Logging Engineer, 167 Walnut Lane, Eugene, Oregon.
Territory: Washington, Oregon, California.
Specialization: 2, 3, 4, 6, 10, 15, 16, 17. Registered professional engineer of the State of Oregon.

Intermountain Timber Service, 4101 State Street, Boise, Idaho.
Consultant: Thomas C. Clifton.
Territory: Idaho and a portion of eastern Oregon.
Specialization: 2, 4, 6, 8, 15, 16, 17. Also logging road construction cost studies, and logging cost studies made. Buying and selling of timber and timberlands as a service to either buyer or seller.

***Gorham E. Jackson,** Consulting Forester, 604 West Main Street, Washington, North Carolina.
Territory: Eastern North Carolina, southeastern Virginia. All forest types.
Specialization: 2, 4, 6, 9, 10, 13, 15, 16, 17, 18. Also investigations of forest resources for pulp and paper companies, and land agent for absentee timberland owners.

William E. Jackson, Jr., Forest Engineer, R. F. D. #1, Lexington, Kentucky.
Territory: No limitations.
Specialization: Timberland evaluation, acquisition, investments, management, marketing, litigation and damage appraisal, forest taxation.

Norman G. Jacobson, Consulting Forester, 620 Security Building, Tacoma, Washington.
Specialization: Forest management, forest protection, timber and land appraisal, taxation and forestry policy.

Alex J. Jaenicke, 3040 N. E. 14th Avenue, Portland 12, Oregon.
Territory: Oregon, Washington, California, Idaho, and Montana.
Specialization: 4, 5, 7. Also volume estimates of insect- and disease-killed timber and rates of deterioration for management and taxation purposes.

M. E. Jelley, Consulting Forester, 122 Haywood Avenue, Chattanooga 5, Tennessee.
Territory: Southeastern and eastern states.
Specialization: 2, 3, 4, 10, 11.

David G. Jennings, Consulting Forester, P. O. Box 467, Port Jefferson, New York.
Territory: New York.
Specialization: 1, 3, 4, 6, 15, 18.

***F. J. G. Johnson and Associates,** Suites 12 & 13, 425 Howe Street, Vancouver 1, B. C., Canada.
Territory: British Columbia (no regional limitation).
Specialization: 2, 3, 4, 6, 11, 15, 16, 17.

Ralph S. Johnson, Laurinburg, North Carolina.
Territory: Eastern Carolinas.
Specialization: 3, 4, 6, 13, 15, 16, 17.

Robert W. Jones, 7723 S. E. 27th, Mercer Island, Washington.
Territory: Washington.
Specialization: 10, 11, 15, 16, 17, 18. Also photogrammetry and court cases concerning boundary disputes.

E. V. Jotter, Consulting Forester, 30 Cedarlawn Drive, Dayton 5, Ohio.
Territory: Ohio, Kentucky.
Specialization: 3, 4, 6, 9, 11, 16, 17, 18. Also development and management of community forests, conservation education, cooperation with soil conservation districts.

Frank E. Karpick, 130 Kay St., Buffalo, 15, New York.
Territory: Northeastern United States.
Specialization: 1, 5, 7, and planning and maintenance programs for municipal shade trees.

***S. G. Keedwell & Company, Inc.,** Consulting Foresters, Emporia, Virginia.
Territory: Eastern and southern U. S.
Specialization: 3, 4, 10, 11, 13, 15, 16, 17. Also forest litigation and purchase and sale of land and timber.

John F. Kellogg, Forester, Box 135, Elizabeth, Louisiana.
Territory: Louisiana; pine and hardwood.
Specialization: 4, 5, 11, 16, 17.

***George C. Kiefer, Jr.,** Consulting Forester, Salisbury, Connecticut.
Territory: Southern New England, eastern New York.
Specialization: 4, 6, 8, 15, 16, 17, 18. Also management of timber properties and plantations, timber marking and marketing, watershed management, and agent for woodland owners.

H. Thorn King, Consulting Forester and Land Surveyor, Hancock, New Hampshire.
Territory: Southwestern New Hampshire.
Specialization: 2, 3, 4, 15, 16, 17, 18. Also tree farming; marking; registered land surveyor.

G. Ed. Knapp, Consulting Forester, 1410 Broadway, Macon, Georgia.
Associate: Donald L. Martindale. (Both registered foresters.)
Territory: Southern states.
Specialization: 2, 3, 4, 10, 11, 13, 16, 17. 18.

Robert F. Knoth & Company, Foresters, Appraisers, Surveyors, 132 East Bay Street, Charleston 3, South Carolina.
Consultant: *Robert F. Knoth.
Territory: Domestic and foreign.
Specialization: 4, 6, 10, 11, 13, 15, 16, 17, 18. Land agent for absentee timberland owners; foreign timberland investigations; veneer log procurement; timber acquisitions; sales, investments, and loans.

Arthur Koehler, Wood Technologist, 1959 Thayer Ave., Los Angeles 25, California.
Specialization: Wood utilization.

J. Hugo Kraemer Associates, Consulting Foresters, 249 Lark Street, Albany 10, New York.
Territory: New York and New England.
Specialization: 2, 3, 4, 6, 11, 15, 16, 17, 18, 21. Also timberland management and research projects.

F. Bruce Lamb, Tropical Forestry Consultant, Box 327, Canon City, Colorado.
Territory: Mexico, Central and South America, and Caribbean Islands.
Specialization: 2, 3, 4, 10, 11, 15, 16, 17, 18. Mahogany and other tropical hardwoods.

William N. Lane, Forest Management Consultant, Crown Point Road, Rochester, New Hampshire.
Territory: Northeastern United States.
Specialization: 2, 3, 4, 5, 6, 7, 8, 11, 13, 15, 16, 17, 18. Also damage surveys, forest litigation and timber depletion accounting.

The Langdale Company, P. O. Box 980, Valdosta, Georgia.
Consultants: Harley Langdale, Jr., T. E. Connell.
Territory: Georgia, northern Florida; slash pine belt.
Specialization: 2, 3, 4, 6, 8, 9, 10, 11, 12, 13, 15, 16, 17, 18, 19.

***Frank M. Langford,** Waverly, Tennessee.
Territory: Middle Tennessee, south Kentucky, and north Alabama.
Specialization: Timber real estate —evaluations. Utilization specialist in hardwoods.

D. E. Lauderburn, 1204 Adeline St., Hattiesburg, Mississippi.
Territory: South Mississippi and adjacent territory.
Specialization: 2, 3, 4, 11, 12, 13, 16, 17. Timber sales service including marking, supervision, and inspection.

Frank J. Lemieux, Consulting Forester, 833 Whitney Building, New Orleans, Louisiana.
Territory: Southern states, Mexico, Central and South America.
Specialization: 2, 4, 6, 13, 15, 16, 17.

Paul C. Lemon, Consulting Forester, State College, Albany 3, New York.
Territory: New York and New England.
Specialization: 1, 6, 9, 14. Also commercial pilot, applications of aviation to forestry.

T. A. Liefeld, Consulting Forester, Thomasville, Georgia.
Territory: Florida, Georgia.
Specialization: 2, 3, 4, 5, 6, 7, 8, 11, 12, 13, 15, 16, 17, 18.

L. D. Lloyd, Consulting Forest and Logging Engineer, Flying L Ranch, Glenwood, Washington.
Territory: Worldwide.
Specialization: 2, 3, 4, 6, 8, 10, 13, 15, 16, 17.

Harvey J. Loughead, Consulting Forester, 399 Vanderbilt Road, Biltmore, Station, Asheville, North Carolina.
Territory: Eastern U. S.
Specialization: 3, 4, 12, 13, 16, 17. Also watershed management.

Robert T. MacDougall, Jr., 124 Cresta Drive, Ukiah, California.
Territory: Coast pine and southern redwood regions of California.
Specialization: Timber cruising, forest management, mapping.

Donald K. Maissurow, Consulting Forester, New Haven Avenue, Derby, Connecticut.
Territory: New England.
Specialization: 1, 4, 15, 16, 17. Also landscape forestry.

Carol W. Marlow, 4232 Redonda Lane, Dayton 6, Ohio.
Territory: Ohio.
Specialization: 1, 5, 7. City shade tree maintenance programs.

E. D. Marshall, Consultant in Forest Products, 541 Humason Ave., Lufkin, Texas.
Territory: Southern and western United States; Mexico, Central and South America.
Specialization: 3, 4, 11, 13, 16, 17, 19, 20, 21.

Raymond H. Marshall, Consulting Forester and Land Surveyor, 5 Pine Street, Littleton, New Hampshire.
Territory: Northern New Hampshire and Vermont.
Specialization: 3, 4, 6, 13, 15, 16, 17, 18.

William Maughan, Consulting Forester, 5 Sylvan Road, Durham, North Carolina.
Territory: Southeastern United States.
Specialization: 2, 3, 4, 8, 16, 17, 18.

***Edward A. McAllister,** 311 Lynchburg Avenue, Colonial Heights, Virginia.
Territory: Virginia and Southeast.
Specialization: 3, 4, 9, 10, 11, 13, 16, 17.

Earl M. McChesney, Consulting Forester, 57 New York Street, Bangor, Maine.
Specialization: 1, 4, 15, 16, 17, 18.

The Ben Meadows Co., 315 Pharr Road, N. E., Atlanta, Georgia.
Consultant: *Ben C. Meadows.
Territory: Southeast.
Specialization: 4, 11, 13, 16, 17. Also complete line of forestry tools and equipment for the forester and timber owner.

Fred B. Merrill, Consulting Forester, Box 261, Clinton, Louisiana.
Territory: Mississippi and Louisiana, within 100 miles of Baton Rouge.
Specialization: 4, 5, 6, 7, 11, 13, 16, 17. Also buying and selling timberlands; training estate and company personnel; and Gaylord pulpwood dealer in East and West Feliciana Parishes.

James W. Meteer, Consulting Forester, R. D. 6, Wooster, Ohio.
Territory: Not limited.
Specialization: 2, 3, 4, 11, 16, 17, 18. Also Christmas tree management. Specialist in continuous forest inventory.

William H. Meyer, Consulting Forester, West Rupert, Vermont.
Territory: Northeast.
Specialization: 3, 4, 9, 11, 16, 17, 18. Also farm management and conservation education.

Raymond M. Miller, Consulting Forester, P. O. Box 802, Jamestown, New York.
Territory: Pennsylvania, New York, Ohio.
Specialization: 4, 16, 17. Also timber and lumber marketing service.

Milliken Forestry Co., Box 5404, Shop Road, Columbia, South Carolina.
Consulting Foresters: William F. Milliken, K. M. Allan, Monroe F. Greene.
Territory: Southeast, principally South Carolina.
Specialization: 3, 4, 6, 11, 13, 15, 16, 17, 18. Also tree planting; agent for absentee owners; hardwood-pine conversion work.

Walter L. Mills, Forester, 2308 Church Street, P. O. Box 21, Selma, Alabama.
Territory: Southeast.
Specialization: 2, 3, 4, 5, 6, 7, 10, 13, 16, 17, 18.

***William J. Mills,** Forest Engineer, 201 Volunteer Building, Chattanooga 2, Tennessee.
Territory: Southeastern states, Mexico.
Specialization: 3, 4, 11, 13, 15, 16, 17.

R. B. Milne, Consulting Forester, Box 371, Petersburg, Virginia.
Territory: Eastern states; all forest types.
Specialization: 3, 4, 10, 16, 17.

Stuart Moir, Forest Counsel, Western Forestry and Conservation Association, 712 U. S. National Bank Building, Portland 4, Oregon.
Territory: Western United States, British Columbia, Alberta, Canada.

***Robert Moore,** Consulting Forester, Danville, Pennsylvania.
Territory: Not restricted.
Specialization: 2, 3, 4, 6, 8, 10, 11, 13, 15, 16, 17, 18, 19. Also bankruptcy cases, trade association work, coal lands, trusteeship cases, litigation and damage claims, estate problems.

R. A. Morin, Consulting Forester, 2532 Sunset Ave., Greenville, North Carolina.
Territory: Eastern North Carolina.
Specialization: 4, 13, 16, 17, 18. Also growth studies, timber marking and marketing, and agent for absentee timberland owners.

George W. Morrill, Jr., Consulting Forester, R. F. D. #3, Concord, New Hampshire.
Territory: New Hampshire, Maine, Vermont.
Specialization: 4, 13, 15, 16, 18. Also landscaping, forest recreation, and beautification.

Philip J. Moses & Co., Woodland managers, Foresters-Entomologists, Lake City, Florida.
Consultants: K. E. Swinford, E. W. Gemmer, and J. W. Willingham.
Territory: Southern United States.
Specialization: 4, 5, 7, 11, 12, 15, 16, 17. Industrial plant location surveys, damage appraisals.

Peter R. Mount, Consulting Forester, Route #3, Kingston Springs, Tennessee.
Territory: Kentucky-Tennessee, Tennessee River Valley.
Specialization: 2, 3, 4, 8, 10, 11, 15, 16, 17, 18.

Charles H. Moyer, Consulting Forester, R. F. D. #2, Newfield, New York.
Territory: Northeast.
Specialization: 4, 10, 15, 16, 17.

National Timber Consultants, Box 497, Salem, Missouri.
Consultants: Ed Woods, Charles Kirk.
Territory: Central and southern states.

Specialization: Management information, land appraisal and valuation, mapping and estimating.

Chris Nelson, Jr., Consulting Forester, Corrigan, Texas.
Territory: Southern and southwestern United States and tropical America.
Specialization: 3, 4, 16, 17, 18.

New England Forest Industries, Inc., 3 North State Street, Concord, New Hampshire.
Consultants: Bradford Monk, Penacook, New Hampshire; Robert Eggleston, Alton, New Hampshire.
Territory: New England.
Specialization: Planting, selective logging, appraisals, forest land brokerage, intermediate cuttings, marking, surveys, and cruises.

New England Forestry Foundation, 3 Joy Street, Boston 8, Massachusetts.
Consultants: *J. Milton Attridge, Stanley B. Coville, Frederic P. Elwert, Kenneth E. Jones, Benjamin W. Nason,, Allan W. Plumb, Donald R. Poppema, David Ripley, III, David A. Rock, Richard L. Sawyer.
Territory: New England.
Specialization: 2, 3, 4, 5, 6, 7, 8, 9, 10, 13, 15, 16, 17, 18.

New England Silvicultural Service, Athol Road, Petersham, Massachusetts.
Consultant: Fred M. Hunt.
Territory: Central New England.
Specialization: 4, 10, 15, 16, 17, 18. Also management of pine plantations.

S. A. Newman, Forest Engineers, P. O. Box 156, Everett, Washington.
C. C. Lloyd, Associate.
Territory: Washington.
Specialization: 8, 10, 15, 16, 17.

Nittany Timberlands, Inc., 124 Osmond St., State College, Pennsylvania.
Consultants: R. A. Bartoo, Orvel A. Schmidt, and Frank J. Wawrynovic.
Territory: Pennsylvania.
Specialization: 4, 9, 13, 16, 17, 18.

***Leon A. Nix**, Consulting Forester and Logging Engineer, 260 N. Main St., Brampton, Ontario, Canada.
Territory: Not limited.
Specialization: 2, 3, 4, 6, 10, 13, 15, 16, 17. Also farm woodlot management.

Northeast Forestry Service, First National Bank Bldg., Hawley, Pennsylvania.
Stanley Mesavage, Consulting forester.
Territory: New York, New Jersey, and Pennsylvania.
Specialization: 3, 4, 10, 11, 15, 16, 17.

Northern Timber Services, Curtis R. Lytle, Consulting Forester, Box 365, Wellsboro, Pennsylvania.
Territory: North central Pennsylvania.
Specialization: 4. Also sugar-bush and Christmas tree management.

Northern Tree Co., Inc., Petoskey, Michigan.
Consultants: *Thomas F. Schweigert, George E. Young, and William J. McDowell.
Territory: Michigan.
Specialization: 1, 4, 5, 6, 7, 15, 16, 17, 18. Also contract tree planting; registered land surveyor.

Ernest Nutting, Consulting Forester, Box 51, Camden, South Carolina.
Territory: The Carolinas and Georgia.
Specialization: 4, 13, 15, 16, 17, 18.

W. R. Owens, Consulting Forester, 3902 North Street, Nacogdoches, Texas.
Territory: Texas, Louisiana, Arkansas, Oklahoma, New Mexico.
Specialization: 15, 16, 17. Complete timber management, investigations for legal actions involving timber or timberland. Also registered public surveyor.

Panhandle Timber and Land Service, Box 177, Coeur d'Alene, Idaho, Phone: MOhawk 4,2015 or MOhawk 4,3340.
Consultant: Robert S. Nobis.
Territory: Inland Empire.
Specialization: 2, 3, 4, 6, 15, 16, 17. Also timber sale contract administration; ownership and cutting line establishment; and public domain land status, regulation and application forms.

Penta Post and Treating Co., Box 5, Tuttle, Idaho.
Consultant: Steele Barnett.
Territory: Idaho.
Specialization: 1, 2, 3, 4, 6, 14, 15, 16, 17, 18, 19.

Pomeroy & McGowin, Forest Managers, Monticello, Arkansas, and Chapman, Alabama.
Consultants: L. K. Pomeroy, Julian F. McGowin (S.A.F. Associate Member), *Z. W. White, T. R. Scott, Jr., W. V. Gandy, D. W. Samson.
Territory: Southern states, South America.
Specialization: 4, 8, 11, 13, 16, 17, 18. Also aerial forest surveys.

Pond & Moyer, Inc., Co., Consulting Foresters, 107 Homestead Road, Ithaca, New York.
Consultant: *James D. Pond.
Territory, New York and Northeast, Latin America, northern hardwoods, spruce - fir, central hardwoods, tropical woods.
Specialization: 1, 2, 3, 4, 8, 10, 11, 13, 15, 16, 17, 18, 21.

Prentiss & Carlisle Company, Inc., Timberland Service — Engineers, 107 Court Street, Bangor, Maine.
Consultants: George T. Carlisle, Philip P. Clement, Robert W. Averill, George D. Carlisle, Edward K. Brann, and William D. Barron.
Territory: United States, Canada.
Specialization: 2, 3, 4, 8, 10, 11, 13, 15, 16, 17, 18.

W. H. Price, Forest Consultant, 2626 West Lynn Street, Seattle 9, Washington.
Specialization: 1, 4, 6, 7, 8, 16, 17.

John G. Rawls Co., Consulting Foresters, 2793 Pinewood Drive, Macon, Georgia.
Consultant: John G. Rawls (S.A.F. Affiliate Member).
Territory: Southeast.
Specialization: 10, 12, 13, 15, 16, 17.

A. B. Recknagel, P. O. Box 15, Ithaca, New York.
Territory: Anywhere in continental United States.
Specialization: Forest management, forest utilization (particularly pulp and paper).

***Tom Reimer**, Consulting Forester, Box 395, Albany, Georgia.
Territory: No restrictions.
Specialization: 2, 3, 4, 6, 10, 12, 13, 15, 16, 17, 18.

Charles E. Reynolds, 4150 S. W. 110 Avenue, Beaverton, Oregon.
Territory: Washington, Oregon.
Specialization: 4, 10, 15, 16, 17, 18.

***Owen L. Riley**, Consulting Forester, P. O. Box 31, Pine Mt. Valley, Georgia.
Territory: Georgia and Alabama.
Specialization: 4, 11, 16, 17, 18. Also agent for timberland owners; timber marketing and assistance; damage appraisal.

Robinson Improvement Company, St. Augustine National Bank, St. Augustine, Florida.
Consultant: Allen D. Nease.
Territory: Florida and south Georgia.
Specialization: 2, 3, 4, 5, 6, 7, 9, 12, 13, 15, 16, 17, 18.

A. P. Russell, Forest Engineer, 11 Maplewood Drive, Sumter, South Carolina.
Territory: Not limited, but principally southern region.
Specialization: 2, 3, 4, 10, 11, 13, 15, 16, 17, 18. Also forest resource surveys for industry, timberland acquisition and sales, contract logging supervising, log scaling and grading.

Sable Mountain Corporation, 68 Phillips Street, Rutland, Vermont.
Consultant: *Richard C. Rose.
Territory: Central Vermont.
Specialization: Woodland management, including marking and marketing of standing timber and trained work crew for planting, pruning, and timber stand improvement. Also operate own forest.

Eino Sainio, Consulting Forester, 320 W. Helen St., Newberry, Michigan.
Territory: Eastern Upper Peninsula of Michigan.
Specialization: 3, 4, 13, 15, 16, 17. Registered land surveyor and registered forester.

Paul M. Sanders, Consulting Forester, 916 Yeon Bldg., Portland 4, Oregon.
Territory: Unrestricted.
Specialization: 2, 4, 6, 8, 15, 16, 17, 18. Property management for absentee owners.

Roy Dale Sanders, Visual Education Technician, Rural Route 6, Evrodale, Brainerd, Minnesota.
Territory: Unlimited.
Specialization: Forester, wildlife technician, photographer. The entire production supervision of 16 millimeter color educational motion pictures, including script writing, direction, photography, editing, and sound supervision. Also production of color and black and white still picture visual education material.

Sandhill Forestry Company, 206 Surgi-

nor Road, Rockingham, North Carolina.
Consultant: Walter J. Marshburn, Jr.
Territory: Southeastern United States.
Specialization: 3, 4, 6, 13, 16, 17, 18. Also woodland property sales.

L. E. Sawyer, R. R. #1, West Terre Haute, Indiana.
Territory: Southwestern Indiana and southeastern Illinois.
Specialization: 4, 5, 6, 7, 16, 17, 18.

Joseph A. Schmidt, Consulting Forester, Box 470, Charleston, South Carolina.
Territory: Southeast.
Specialization: 4, 13, 15, 16, 17. Also growth studies, timber marking.

William R. Schofield, Forest Engineer & licensed Civil Engineer, 681 Market Street, San Francisco 5, California.
Territory: California.
Specialization: 5, 6, 7, 8, 15, 16, 18.

C. D. Schultz & Co., Inc., Forestry and Engineering Consultants, 545 White-Henry-Stuart Building, Seattle, Washington.
Consultant: C. D. Schultz.
Territory: Arizona, Oregon, Washington, California mainly; but no regional limitations.
Specialization: 2, 3, 4, 6, 8, 10, 11, 15, 16, 17, 18, 20.

C. D. Schultz & Co., Ltd., Forestry and Engineering Consultants, 325 Howe Street, Vancouver, British Columbia.
Consultants: C. D. Schultz and 16 members of the Canadian Institute of Forestry. Present staff 60 members.
Territory: No regional limitations.
Specialization: 2, 3, 4, 6, 8, 10, 11, 13, 15, 16, 17, 18, 19, 20.

James W. Sewall Company, Consulting Foresters, Old Town, Maine, and Fredericton, New Brunswick, Canada.
Consultants: Frank M. Call, Elmer G. Kelso, Charles Slight, Carleton C. Young, Jr., Theodore C. Tryon, Earl W. Raymond, Edwin Forsythe.
Territory: Northeast.
Specialization: 3, 4, 5, 8, 13, 15, 16, 17, 18. Also aerial photography.

R. B. Shannon & Associates, Registered Surveying—Consulting Forestry, Colwell-Arnold Building, Kittanning, Pennsylvania; also Indiana, Pennsylvania, and Emporium, Pennsylvania.
Consultants: Robert B. Shannon.
Territory: Pennsylvania, New York, Ohio, West Virginia.
Specialization: 2, 4, 15, 16, 17, 18. Also timber damage appraisals; construction layout; photogrammetric cartography.

***James R. Simmons,** Consulting Forester, 30 Gordon Street, Bel Air, Maryland.
Territory: Eastern states.
Specialization: 2, 3, 4, 10, 15, 16, 17, 18.

William R. Sizemore & Co., Foresters, Surveyors, and Land Managers, Tallassee, Alabama.
Consultants: William O. Geirns, William R. Sizemore, James C. Stevenson, William T. Ogletree, and Mary H. Sizemore (S.A.F. Associate Member).
Territory: Southeast.
Specialization: 2, 3, 4, 8, 11, 13, 15, 16, 17, 18.

Samuel S. Snook, P. O. Box 521, Walterboro, South Carolina.
Territory: South Carolina.
Specialization: 4, 15, 16, 17.

Dean Solinsky, Hobart Bldg., San Francisco 4, California.
Territory: California.
Specialization: Timberland appraisals and management.

***Seymour I. Somberg,** 415-146 Olympia Bldg., Miami 32, Florida. Phone FRanklin 4-2523.
Territory: Southeastern U. S. and Latin, Central, and South America.
Specialization: 2, 3, 4, 8, 10, 11, 13, 15, 16, 17, 20. Acquisition and management for investors; forest resource surveys for industry.

South Carolina Forest Management Service, Ritter, South Carolina.
Forest Consultant: Hugo J. Pawek.
Territory: West Virginia, Virginia, North Carolina, South Carolina, Tennessee, Georgia, Florida, and Alabama.
Specialization: 3, 4, 5, 6, 7, 16, 17.

Southeastern Foresters, Forest Consultant, 8113 Fort Caroline Road, Jacksonville 11, Florida.
Consultant: Nelson B. Blocker.
Territory: Southeastern U. S.
Specialization: 3, 4, 6, 8, 12, 13, 15, 16, 17, 18. Also timber resource investigations; timberland management; timber and land sales; insurance company representative for loans on forest properties.

Southern Timber Management Service, Home Office, 209½ N. 21st St., Birmingham, Alabama. Branch offices: 404 Montgomery Ave., Sheffield, Alabama; P. O. Box 723, Auburn, Alabama; 328 Brentwood Lane, Mobile, Alabama; 415 Friar Rd., Chattanooga 11, Tennessee; and P. O. Box 564 Brookhaven, Mississippi.
Consultants: J. M. Bradley, W. H. Mullins, H. E. Murphy, C. B. Umland, Tom Newman, Charles R. Page, Harold Hicks, Guy Parsons & George Holston.
Territory: South Central Atlantic and Caribbean.
Specialization: 1, 2, 3, 4, 8, 10, 11, 12, 13, 15, 16, 17, 18, 21. Also acting as timberland investment counsel and land agent and forester in charge for private, commercial, and absentee-owned timberlands of all sizes with optional complete timber stand improvement cutting, milling, and T.S.I. operations as a service under contract. Contracted objectives under long-range management contracts offered. Resource surveys and industrial plant location services. Tree seed extractory.

Frank Spearey, Consulting Forester, Registered Public Surveyor, P. O. Box 1249, Jacksonville, Texas. Branch office, Rusk, Texas, George K. Goldsberry in charge.
Territory: Gulf States.
Specialization: 4, 15, 16, 17. All phases of land management.

Wallace R. Stacy, Consulting Forester, P. O. Box 21, Walterboro, South Carolina.
Territory: Within 100 miles of Walterboro.
Specialization: 3, 4, 6, 7, 13, 16, 17, 18. Also growth studies, timber marking, fire damage appraisals, forest mapping, timber trespass appraisals, pulpwood and timber sales, timberland agent for absentee timberland owners.

T. J. Starker and Son, 3855 Van Buren Street, Corvallis, Oregon.
Operating consultants: T. J. Starker, Bruce Starker.
Territory: Oregon.
Specialization: 1, 3, 4, 10, 16, 19, 21.

J. F. Stauss, Consulting Forester, 9 Nowlan Road, Hillcrest, Binghamton, New York.
Territory: Northeast and Canada.
Specialization: 2, 3, 4, 8, 10, 11, 13, 15, 16, 17, 18. Also marketing and other forest products; litigation and damage claims.

Charles T. Stealey, Jr., Consulting Forester, 1616 North Pacific, Conroe, Texas.
Territory: Texas and surrounding states.
Specialization: 4, 6, 7, 13, 16, 17, 18.

Edward F. Steigerwaldt, Consultant Forester, Star Route 2, Tomohawk, Wisconsin.
Territory: Lake States.
Specialization: 4, 8, 11, 13, 15, 16, 17, 18. Also aerial photography plans, forest surveys, forest photography, photo interpretation, and property management for absentee land owners.

Fred Stell, Consulting Forester, P. O. Box 42, Glenwood Springs, Colorado.
Territory: Colorado, Wyoming, New Mexico.
Specialization: 4, 6, 9, 14, 15, 16, 17, 18.

Stevens Forestry Service, Consulting Foresters, 701 East Fourth, El Dorado, Arkansas.
Consultants: Irwin E. Stevens, Jim W. Bottoms.
Territory: Southern states.
Specialization: 1, 3, 4, 11, 13, 15, 16, 17, 18.

Raymond E. Stevens, Consulting Forester, 4416 McCulloch Street, Duluth 4, Minnesota.
Territory: Northern parts of Minnesota, Wisconsin.
Specialization: 4, 15, 16, 17, 18. Also field investigation and forest litigation.

John W. Stock, Consulting Forester and Licensed Land Surveyor, Tupper Lake, New York.
Territory: Adirondack Mountains.
Specialization: 3, 4, 10, 15, 16.

William S. Stover, 6178 Louisville Street, New Orleans 24, Louisiana.
Territory: South, but not limited.
Specialization: Forest resource and related investigations; design and planning of forest inventories, and other studies.

W. W. Talbert, Forest Consultant, 1112 Union Road, Lufkin, Texas.

Territory: Texas and surrounding states.
Specialization: 4, 6, 16, 17, 18.

Technical Services, Inc., Consulting Foresters, 415 Broad Street, New Bern, North Carolina.
Consultants: William H. Utley, Nelson M. White.
Territory: North Carolina.
Specialization: 4, 15, 16. Also forest appraisals and investments, industrial investigations, tax evaluation—public and private.

***Richard L. Templin, Jr.,** Consulting Logging Engineer and Forester, 1004 N. W. Hawthorne, Grants Pass, Oregon.
Territory: Oregon and northern California.
Specialization: 2, 4, 10, 15, 16, 17.

Tex-La Land Management Service, P. O. Box 354, Kirbyville, Texas.
Consultants: *A. C. Bace, Jr. and George H. Burfiend.
Territory: East Texas and western Louisiana.
Specialization: 3, 4, 5, 6, 7, 11, 13, 16, 17, 18. Also acting as land and forest managers for private, commercial, and absentee-owned timberlands as a service under contract.

Thaddeus Thorne, Consulting Forester, Center Conway, New Hampshire.
Territory: Northeast.
Specialization: 2, 4, 15, 16, 17, 18. Timber sales, marking, forestland real estate.

Tillinghast & Reed, Consulting Foresters, Danville, West Virginia, Phone: Madison, West Virginia.
Consultants: John Tillinghast, Marvin Reed, R. Joe Johnson.
Territory: West Virginia, eastern Kentucky, western Virginia.
Specialization: 3, 4, 6, 15, 17, 18, 19, 20. Timberlands in coal-producing areas a specialty; services available on job basis or on annual retainer fee. Also dealers and distributors forestry equipment.

Timber Management Service, P. O. Box 953, Klamath Falls, Oregon.
Consultant: Robert W. Mezger.
Territory: Ponderosa pine region.
Specialization: 2, 3, 4, 6, 8, 15, 16, 17, 18.

J. M. Tinker, Registered Forester, Statesboro, Georgia.
Territory: Savannah trade area.
Specialization: Timber cruising, marking, marketing and consulting.

Anton J. Tomasek, 1828 Lincoln, Des Plaines, Illinois.
Territory: Illinois, Indiana, Michigan, and Wisconsin.
Specialization: 3, 4, 9, 11, 16, 18. Also tree diseases and insects, forest recreational development.

Tree Farm Management Service, Inc., 1166 7th Avenue West, Eugene, Oregon.
Consultants: *Verne D. Bronson, chief forester; *Lyle H. Seymour, John W. Davis, H. N. Cory.
Territory: Not limited.
Specialization: 2, 3, 4, 5, 6, 7, 8, 9, 13, 15, 16, 17, 18. Complete tree farm management, inventory and special studies of forest lands, salvage harvest supervision, forestry research, aerial photo procurement and interpretation.

Henry H. Tryon, Consulting Forester, retired, 327 Mountain Road, Cornwall-on-Hudson, New York.
Specialization: Sprout hardwoods.

John C. Van Camp, Jr., Consulting Forester, 2028 Hawthorne Drive, Rockford 115, Illinois.
Territory: Northern Illinois, southern Wisconsin.
Specialization: 4, 5, 6, 7, 15, 16, 17, 18. Also farm and estate forestry, municipal forestry, Dutch elm disease control programs.

Van Vliet and McKimmy, Forest Products Specialists, 1336 Dixon Street, Corvallis, Oregon.
Consultants: A. C. Van Vliet and M. D. McKimmy.
Territory: Oregon, Washington, and California.
Specialization: 3, 11, 19, 20, 21. Also industrial engineering applications, feasibility studies, production and quality control techniques, and analysis of specific problems related to wood properties in the production of forest products.

James M. Vardaman & Company, First National Bank Bldg., Laurel, Mississippi.
Consultant: James M. Vardaman.
Territory: Southeastern United States.
Specialization: 16, 17. Also own and operate medium-sized tree farm.

Wall and Larson, Foresters, 5524 Elvas Avenue, Sacramento, California.
Consultants: Myron S. Wall, Jr., Jack E. Larson, James F. Nicklos, Henry C. Schwarz.
Territory: Western states.
Specialization: 2, 3, 4, 6, 7, 8, 10, 11, 15, 16, 17, 18. Also licensed surveying; aerial photo interpretation; land and timber sales and supervision; land valuation and appraisal; log scaling service.

Robert D. Washburn, Forestry Consultant, Route 1, Box 461, Marquette, Michigan.
Territory: Upper Michigan and the Lake states.
Specialization: 2, 4, 10, 15, 16, 17. Also land appraisal. Registered surveyor and registered forester, State of Michigan.

Arthur J. Weinheimer, Consulting Forester, R.F.D. # 1, Old Chatham, New York.
Territory: Eastern New York.
Specialization: 4, 18.

Edward H. Werner, Consulting Forest Engineer, 3122 H Street, Sacramento, California.
Territory: California:
Specialization: 3, 4, 10, 16. Also timber and log buyer, logging inspector and personal representative for buyers and sellers of timber and range lands.

Western Timber Services, Arcata Hotel, Arcata, California.
Consultant: Robert E. Kleiner.
Territory: Not restricted.
Specialization: 2, 4, 8, 10, 15, 16, 17, 18.

***J Atwood Whitman,** Consulting Forester, Glendon, North Carolina.
Territory: Eastern and southern United States.
Specialization: 2, 3, 4, 8, 15, 16, 17, 18. Also forest damage appraisal, forest litigation, growth analysis, timber type maps and municipal forestry.

S. A. Wilde, Soils Department, University of Wisconsin, Madison 6, Wisconsin.
Territory: Wisconsin, Minnesota, Michigan, Missouri, Illinois, Indiana, Ohio.
Specialization: 18. Including survey of forest tracts, selection of planting sites, management of forest nursery soils.

John F. Williams & Co., Consulting Forester, Windsor, North Carolina.
Territory: North Carolina.
Consultants: John F. Williams and Robert E. Gustafson.
Specialization: 2, 3, 4, 13, 15, 16, 17.

Richard E. Wilson, 11½ Fifth Ave., Saratoga Springs, New York.
Territory: Not restricted.
Specialization: 18. Establishment and care of plantations.

S. Leigh Wilson, Consulting Forester, 605 Camellia Circle, Florence, South Carolina.
Specialization: 3, 4, 16, 17, 18.

Paul T. Winslow, Consulting Forester, Staatsburg, Duchess County, New York.
Territory: Northeast.
Specialization: 1, 3, 4, 11, 15, 16, 17, 18.

K. B. Wood and Associates, Inc., 2623 N.W. Industrial Street, Portland 10, Oregon.
Territory: National.
Specialization: 2, 10, 15, 16, and 17.

Woodland Managers, P. O. Box 542, Lake City, Florida.
Consultants: Philip J. Moses, General Manager, K. R. Swinford, E. W. Gemmer.
Territory: Southeastern United States.
Specialization: Aerial photo interpretation, cruising, damage appraisal, forest management planning, forest maps, growth and yield computations, land surveying, land valuation, tree marking, timber marketing, tree planting, insect problems.

J. E. Woodman, Barnett Bank Building, Jacksonville 2, Florida.
Territory: Eastern United States and Canada.
Specialization: 3, 4, 8, 12, 13, 16, 18.

Herman Work, 1005 Selma Blvd., Staunton, Virginia.
Territory: General.
Specialization: 2, 3, 4, 6, 11, 13, 16.

Robert E. Worthington, Consulting Forester, Quilcene, Washington.
Territory: Olympic Peninsula.
Specialization: 2, 10, 15, 16, 17. Also registered professional engineer and land surveyor.

E. A. Ziegler, Consulting Forester, College Park, Lewisburg, Pennsylvania.
Territory: Middle Atlantic states and Southeastern states to and including Florida.
Specialization: 2, 3, 4, 6, 8, 12, 13, 15, 16, 17, 18.

CONSULTING FORESTERS, CLASSIFIED BY STATES

Alabama
- Glenn O. Antonie
- Walter L. Mills
- William R. Sizemore & Co.
- Southern Timber Management Service

Arkansas
- Paul H. Gerrard
- Pomeroy & McGowin
- Stevens Forestry Service

California
- Russell W. Beeson
- Charles H. Bunting
- Cal-Pacific
- D. Irving Cobb
- John D. Coffman
- Fenner & Day Co.
- Emanuel Fritz
- Hammon, Jensen, and Wallen
- Arthur Koehler
- Robert T. MacDougall, Jr.
- William R. Schofield
- Dean Solinsky
- Wall and Larson
- Edward H. Werner
- Western Timber Services

Colorado
- F. Bruce Lamb
- Fred Stell

Connecticut
- Connwood, Inc.
- George C. Kiefer, Jr.
- Donald K. Maissurow

District of Columbia
- Albert G. Hall & Associates

Florida
- Francis H. Clifton
- Deep South Consulting Foresters
- E. A. Foster
- Gene M. Harris
- Douglas F. Horan
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- John E. Hudson
- P. J. Moses & Co.
- Robinson Improvement Co.
- Seymour I. Somberg
- Southeastern Foresters
- Woodland Managers
- J. E. Woodman

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- The Langdale Company
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- The Ben Meadows Co.
- John G. Rawls
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Idaho
- Intermountain Timber Service
- Panhandle Timber & Land Service
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- William E. Jackson, Jr.

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- Inman F. Eldredge, Sr.
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- John F. Kellogg
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- Earl M. McChesney
- Prentiss & Carlisle Company, Inc.
- James W. Sewall Company

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- L. J. Enright
- William E. Garvey, Jr.
- James R. Simmons

Massachusetts
- New England Forestry Foundation
- New England Silvicultural Service

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- Northern Tree Co., Inc.
- Eino Sainio
- Robert D. Washburn

Minnesota
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- Roy Dale Sanders
- Raymond E. Stevens

Mississippi
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- Randle J. Dedeaux
- Employment Service
- Forestry Suppliers, Inc.
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- Carl Hammarstrom
- D. E. Lauderburn
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